Special Features: Telegames And Nonviolent Games

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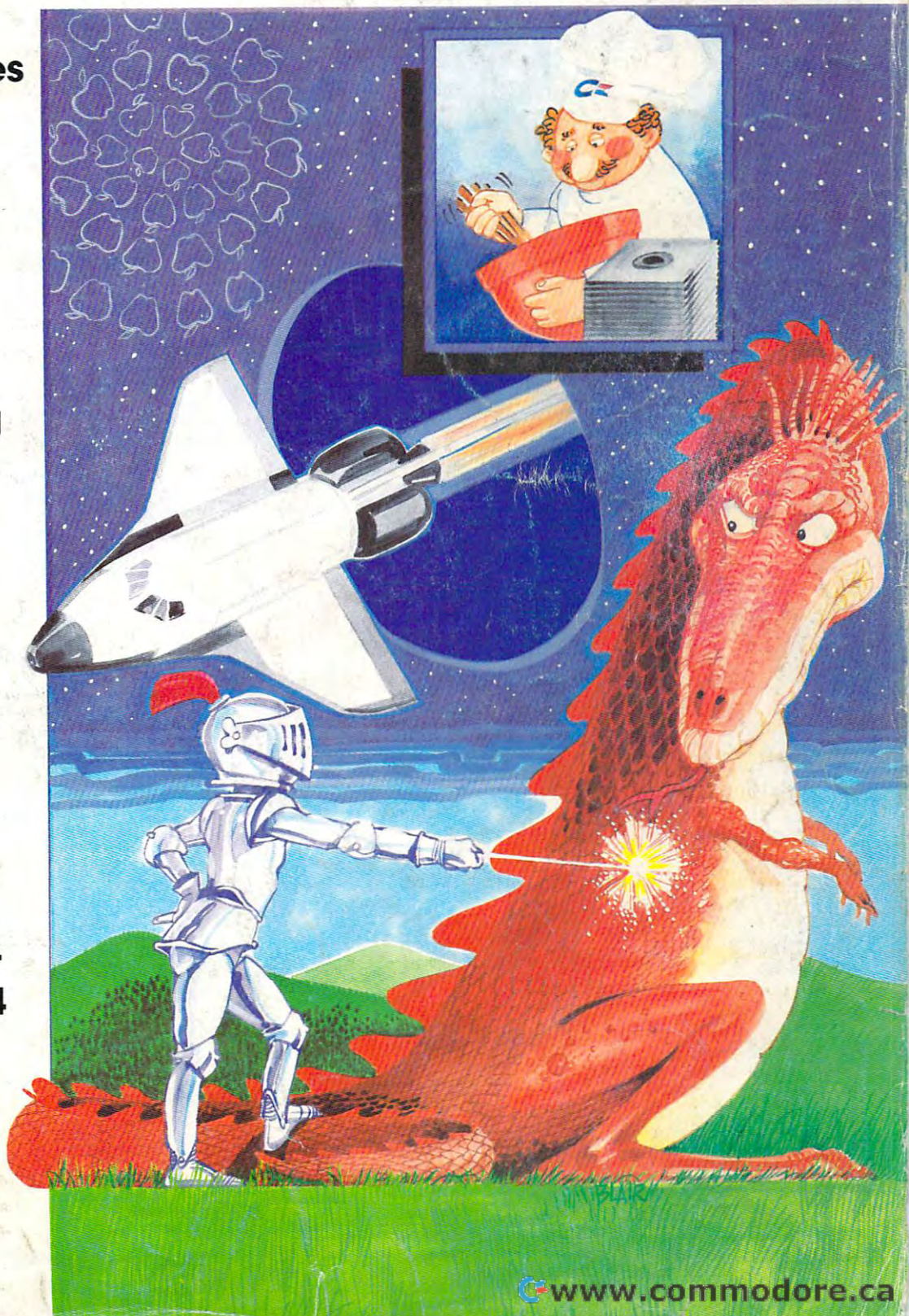

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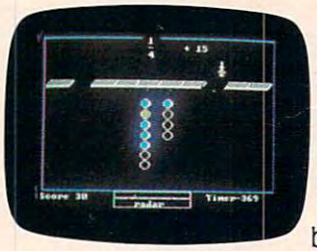
Some of the games you see on these two pages help exercise your child's creativity. Others help improve vocabulary and spelling skills. While others improve your child's writing and reading abilities. And all of them help your child understand how to use the computer.

So if you're looking for computer programs that do more than just "babysit" for your kids, read on. You'll find that our Early Learning Programs are not only compatible with **Apple,® Atari,® IBM®** and **Commodore 64™** computers, but also with kids who like to have fun.

FRACTION FEVER™ brings fractions into play. Ages 7 to Adult.



FRACTION FEVER is a fast-paced arcade game that challenges a child's understanding of fractions. As kids race across the screen in search of the assigned fraction, they're actually developing a basic understanding of what a fraction is and of relationships between fractions. They're even discovering that the same fraction may be written in a number of different ways.

All in all, FRACTION FEVER encourages kids to learn as much as they can about fractions – just for the fun of it!

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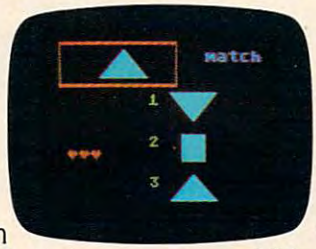
STORY MACHINE is like a storybook come to life. Using the keyboard, your children write their own fun little stories. The computer then takes what they've written and animates their story on the screen, complete with full color graphics and sound.

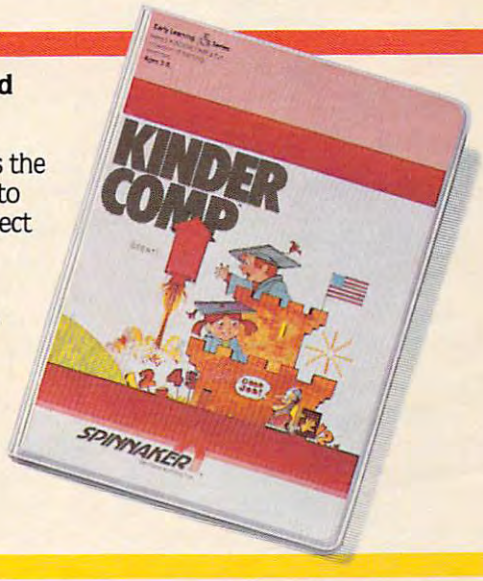
STORY MACHINE helps your children learn to write correctly, become familiar with the keyboard, and lets them have fun exercising their creativity at the same time.

KINDERCOMP.™ Numbers, shapes, letters, words and drawings make fun. Ages 3 to 8.



KINDERCOMP is a game that allows very young children to start learning on the computer. It's a collection of learning exercises that ask your children to match shapes and letters, write their names, draw pictures, or fill in missing numbers. And KINDERCOMP will delight kids with colorful rewards, as the screen comes to life when correct answers are given.

As a parent, you can enjoy the fact that your children are having fun while improving their reading readiness and counting skills.



FACEMAKER™ makes faces fun. Ages 4 to 12.

FACEMAKER lets children create their own funny faces on the screen. Once a face is completed, your children will giggle with delight as they make it do all kinds of neat things: wink, smile, wiggle its ears, or whatever their imagination desires.

Plus, FACEMAKER helps children become comfortable with computer fundamentals such as: menus, cursors, the return key, the space bar, simple programs, and graphics. FACEMAKER won't make parents frown because their children will have fun making friends with the computer.

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EDITOR'S NOTES

Our thanks to those of you who recently participated in our subscriber survey. Initial results are being reported now, and we'll share some of those with you. One of the number sets of most interest to me was spouse readership. This industry has quite typically been reflected in readership studies as a predominantly male audience. While this is accurate, we have maintained that, as a "family" oriented magazine, we have a high degree of family/spouse participation in computing and COMPUTE!. We suspected that, in addition to the seven or eight percent female readership that would show up in response to a normal question, analysis of family utilization would show far more general involvement. We're pleased to report that this is, in fact, the case. In COMPUTE! families, we discovered that 29 percent of spouses regularly read COMPUTE!. Further evidence that our industry is turning into a truly broad-based consumer computing marketplace.

Here are some of the other results of the survey that we think you'll find of interest:

Age	%
under 28	25.7
29-35	26.9
36-43	26.6
over 44	20.8

How do you use your personal computer? (Check all that apply)

You	Spouse	Children	
85.6%	61.6%	75.4%	Recreation and Games
42.2	22.7	3.6	Education for Adults
16.0	8.5	59.7	Education for Children
60.6	22.3	1.5	Personal Business
60.8	24.7	5.4	Other Home Applications
27.4	7.4	0.5	Company Business

And finally, 97.5 percent of you own one or more personal computers. Our survey showed the true depth and breadth of our readership. For example, note the variety of uses in the chart. It's obvious that home computing is far more than simply playing games.

Random Bits:
Given the recent acceleration of rumors, we'll be quite surprised if IBM hasn't announced their new home computer by the time you're reading this .... While avoiding the various issues of rights/wrongs, Kathy Yakal's article on nonviolent gaming in this issue presents a variety of interesting thoughts on the subject of violence and nonviolence in gaming. It's a good article and shows a bit of the depth of thought that people in our industry are putting into one aspect of our collective future. As always, we're interested in your feedback on the topic.

Next month, among other things, we'll have an article sharing in more detail the results of the subscriber survey.

Robert Lock, Editor In Chief

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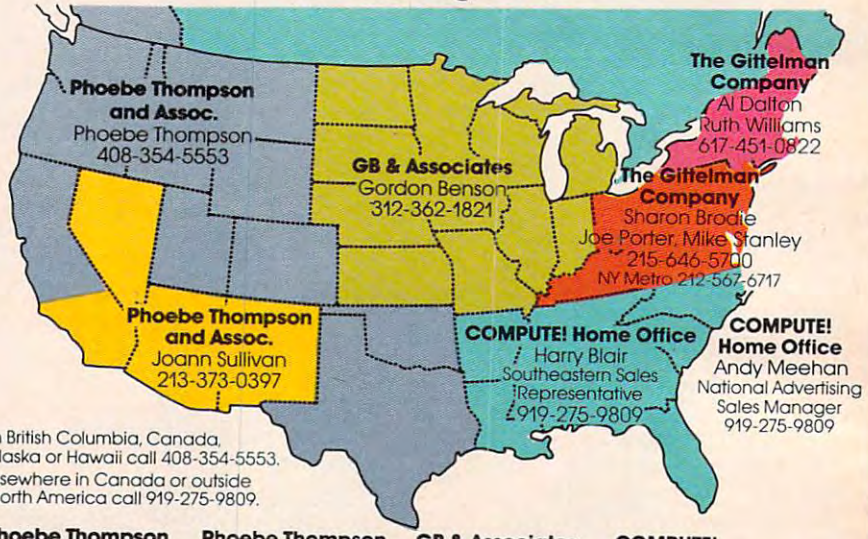

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The Editors and Readers of COMPUTE!

Using An Electric Typewriter As A Printer

After reading an article in the June COMPUTE!, "How to Buy the Right Printer," several readers were intrigued by the possibility of using an electric typewriter as a printer for their computer. Although we cautioned that an electric typewriter may not be fast or durable enough to tolerate continuous typing, there are several interfaces on the market which let you connect your computer to an electric typewriter.

Some modern daisywheel typewriters have an RS-232 serial port, so (assuming your computer can talk to RS-232 devices) if you have the proper cable and software you can attach your computer directly. Other companies manufacture overlays that "press" the keys for you, or have you open up the typewriter to install solenoids which activate levers inside the typewriter. Still another company claims to have a device that converts "computer language" to "typewriter language," but only for certain models. With the price of even letter-quality printers dropping below $400, however, you will have to consider whether or not you want to risk modification of your typewriter which could void its warranty or service contract.

Storing Scriptor And Video 80 On The Atari

In your April issue, you published two interesting Atari programs, "Scriptor" and "Video 80." Here are a few questions. How many pages can you store in a 48K Atari 400 when using Scriptor with 8K BASIC? What is the memory required for Video 80? Can Scriptor and Video 80 be merged, and, if so, what changes would have to be made?

On another subject, how would I "hook up" an Epson MX-80 series printer to my 48K Atari 400 with or without the Atari 850 interface?

Ed Hallinan

Scriptor adapts itself to either 24K, 32K, or 48K and will display the number of lines free when you first run it. Each line is 38 characters. Since a printed page (double-spaced) takes about 30 75-column lines, just divide the "lines free" by 15 for a rough estimate.

Video 80 requires about 2K for the driver routine and another 8K for the high-resolution GRAPHICS 8 screen. Due to this, there is not enough memory left over in a 40K or 48K to let you store the programs and text.

You can attach almost any Centronics parallel or RS-232C serial printer to the Atari via the Atari 850 Interface Device. The new Atari 1025 80-column printer does not require the 850, however.

In our July 1983 Issue, we inadvertently used the name "Castle Quest." The publication of this article is in no way intended to cause confusion with the commercially available product called "Castle Quest" by Michael S. Holtzman and Timothy Baldwin. In the future, we will refer to it as "Castle Search."

Fine Tuning The VIC's Audio And Video

For those who might be having trouble with the picture and sound on their VIC-20, I have a solution.

It is essential that the sound and picture be adjusted properly in the RF modulator so that they are synchronized on either Channel 3 or 4. The computer is sold with the audio and video signals adjusted for one particular TV model. This may not work well on yours.

To make adjustments for your TV, carefully follow these steps:

1. Turn the computer off and the TV on.

2. Turn off the AFT (Automatic Fine Tuning) switch on the TV (if your set has one).

3. Adjust the fine tuning knob on the TV to the middle range of that channel. Don't worry if the picture is partly fading or the sound is distorted at this point.

4. Open the RF modulator very slowly and carefully. *Be sure your power is off.* Remove the casing screw and slowly lift the cover.

5. Turn on your power for the computer.

6. There are two holes which have screws in the metal casing. The one closest to the channel selector switch is the video signal. The other is for audio (see figure). Using *only* a small nonmetallic screwdriver, adjust the video signal until the TV

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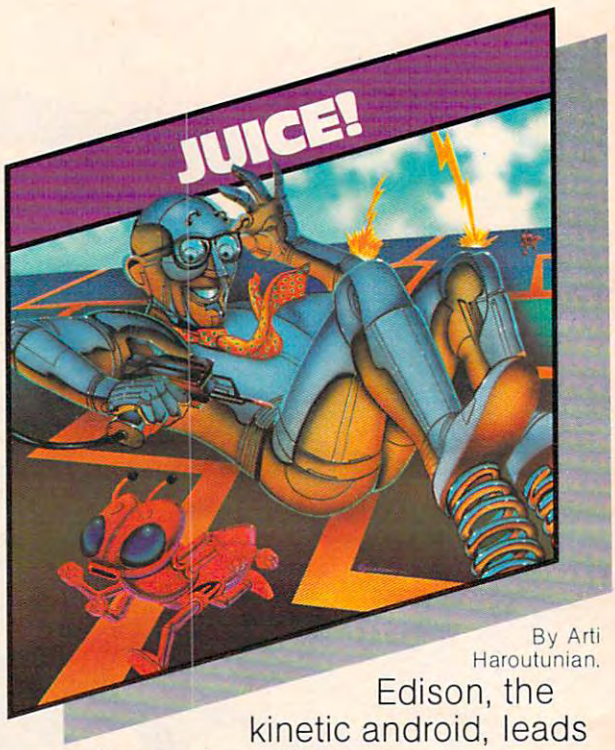

By Arti Haroutunian.

Edison, the kinetic android, leads a frustrating life.

All he wants to do is build his circuit boards and go with the flow. But things keep getting in the way.

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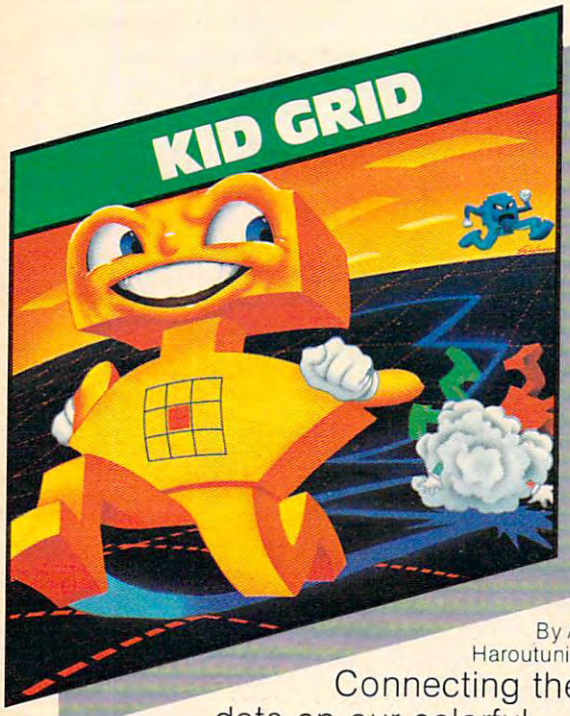


By Arti Haroutunian.

Connecting the dots on our colorful grid should be easy, right?

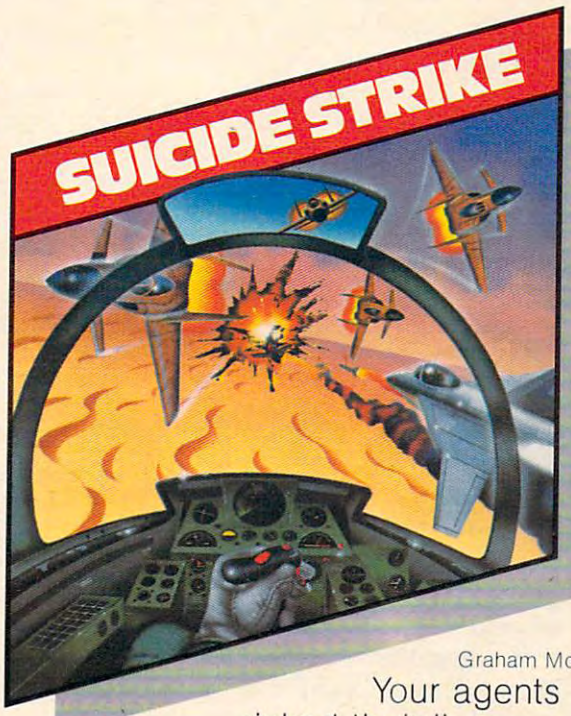
Wrong. Because the bullies are in hot pursuit!

Squashface, Thuggy, Muggy and Moose are their names. And *you* are their game. And what's more, they're faster than you are.

But you're smarter. And you control the stun button.

So keep your eyes peeled for the mysterious question mark and don't slow down at corners!

(Suggested retail: $34.95)



By Graham McKay.

Your agents risked their lives to find the enemy's secret headquarters.

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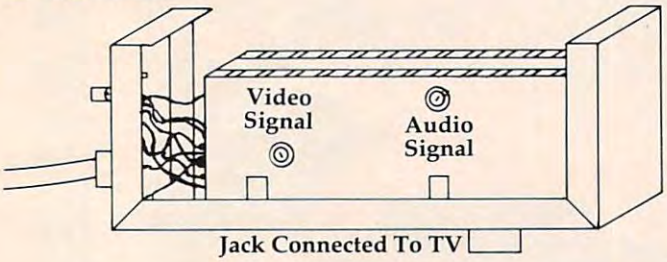
picture is crisp and sharp. This acts like another fine tuning knob. Check the other channel and make sure it is in the middle of the RF signal range by adjusting the fine tuning knob on your TV.

7. Adjust your TV volume to about one-half. Now adjust the audio signal level in the RF modulator until a quiet, clear sound is heard on the TV.

8. Make sure that, on the other channel, both audio and video signals are perfectly adjusted.

9. Turn the computer off and replace the cover on the RF modulator.

RF Modulator



Mark Kormendy

We tried your suggestions and they work very well indeed. However, we do not advocate hardware modifications except when performed by qualified, experienced technicians. Readers should be extremely careful when making internal adjustments on any electrical component. Also, tampering with the RF modulator will void your warranty. (Later versions of the VIC RF modulator may not have the adjustment screws.)

We tested this also on the internal RF modulator in the 64 but found no appreciable difference in screen or audio quality. If we hear of anything significant on this, we'll publish it in a future issue.

TRS-80 Equipment Needed

I represent a nonprofit, charitable organization which uses TRS-80 Model I equipment in virtually every aspect of its affairs. We would be grateful if your readers would consider contributing additional Model I equipment: keyboards, expansion interfaces, drives, and printers would be welcome. All contributions would be fully tax-deductible, since we hold "public charity" status with the IRS.

If you are in a position to make such a contribution or would like more information, please drop me a note or call me (collect, if you like) at (617) 495-9020.

Dr. Robert Epstein
Cambridge Center for Behavioral Studies
11 Ware Street
Cambridge, MA 02138

PET To VIC Or 64 Transfers

In connection with your article on merges in the June 1982 issue of COMPUTE!, I stumbled onto something which I have never seen reported, although something so simple must have been noticed by someone else. I tried loading programs recorded on a cassette on my PET (Original ROM from 1977) into my new Commodore 64. I found that the program appeared to load and would apparently list OK. However, it would not RUN, and one could not list individual lines or groups of lines. Also, on closer examination of the listing, I found that the first line of the original program was missing, and in its place was a 4 or 5 digit number.

I found by experimenting that I could convert the program as loaded into a normal program by a very simple procedure. I started a LIST, but stopped it (with the STOP key) while the first line was still on the screen. I then positioned the cursor first over the number which had replaced the first program line, then executed a RETURN, and then a second RETURN when the cursor was over the second line (which now appeared to be the first). After that, the program could be edited and RUN normally (after replacing the first line, if necessary). I have now used this procedure to transfer a number of programs from my 1977 PET to the 64, but put a line like:

```
10 REM JUNK LINE
```

at the beginning of each program before recording it on the PET. You and others are probably familiar with this, but I have not seen it anywhere. It is a very simple way to transfer programs from one system to the other. I presume this would also work on the VIC-20, and I intend to try this as I also do some programming on a VIC-20 at a school for handicapped children.

Myron T. Kelley

Jim Butterfield replies:

Your letter draws attention to something that is not well known. The very first Commodore computers – the "Original ROM" PETs – saved programs in a slightly different way from all subsequent Commodore machines.

It worked this way: just before the beginning of your BASIC program there is always a value of zero in memory. This is still true, even in VICs and Commodore 64s. But the first model of PET saved programs including the zero. All subsequent Commodore machines saved only the program – not the zero.

This meant that early PETs saved programs with a Load address of 1024; and that all subsequent PET/CBMs saved with a Load address of 1025. On the PET/CBM computers, this made little difference: programs did not relocate, and were loaded back to the right place. With the arrival of the VIC and the Commodore 64, however, programs became relocatable; and these new machines did not expect the extra zero. Result: a confused first line.

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The easiest way to fix up this problem is to LOAD them to any newer PET/CBM and then SAVE them once again. The zero will be dropped and everything will become compatible.

Timex/Sinclair Compatibility Problem

I own a Sinclair ZX81 computer and a Memopak 32K RAM. I recently purchased a Timex/Sinclair 2040 printer, and I am unable to get the computer to work with the Memopak and the printer attached.

The Memopak works fine with the computer alone or with the Sinclair 16K RAM, and the printer works with the computer and with the Sinclair 16K RAM. However, the computer will not display its cursor when the Memopak 32K RAM and printer are both attached.

Can you tell me what's wrong?

Paul R. Harrison

The Timex/Sinclair 2040 printer is not compatible with Memopak for some unknown reason. Memotech, manufacturer of Memopak, is investigating. Contact them directly for further information. As you have noted, the Memopak works very well with the ZX81 – and with the proper interface, works well with a wide range of printers.

Apple Programs For Commodore

I would like to know if Apple programs can be loaded into the Commodore 64 from disk or tape and vice versa?

Anthony Tutter

We have published two articles on loading Apple program tapes into the PET and vice versa. The same procedures which work on the PET should also work on the Commodore 64. These articles are "Feed Your PET Some Applesoft" in COMPUTE!'s First Book of PET/CBM *and "Load Commodore BASIC Program Tapes Into The Apple II" in COMPUTE! (April 1983).*

Some commercial software is available for loading 64 programs from disk into the Apple and vice versa.

PET Monitor Printout

I am an avid user of the PET machine language monitor, but I have never found a way to direct a hexadecimal dump to a printer. Is it possible to do so or am I wasting my time? Please help!

Michael Silano

For 4.0 BASIC PETs, you can print the output by typing X to exit to BASIC, then type:

```
OPEN 4,4: CMD 4: SYS 54386
```

then type the monitor command M. For example, if you wanted a printout of the hex numbers between 0400 and 0420, you would type:

```
.M 0400 0420
```

For Upgrade PETs, you can use the above, but just SYS to 4 (the way you'd ordinarily enter the monitor).

However, the easiest way to control the printer (and many other aspects of machine language programming on the PET) is a "monitor extension" program, "Micromon," published in COMPUTE! (January 1982). It's an excellent tool for machine language programming. It's available for $3 from COMPUTE!'s Back Issues Department.

Conserving Your Computer's Power

I have a VIC-20, and I want to know which is better for the computer – to leave it on constantly or shut it off when you are done using it?

Bob Weber

This is debatable. Some would say that the initial power surge when turning on a computer is actually more damaging to the electronic components than leaving it on continuously. On the other hand, most electronic parts have a definite life span, and leaving the computer on 24 hours a day could shorten the overall useful life of the computer.

Commodore has recently changed the power supplies of both the VIC-20 and the Commodore 64. Some of the new power supplies (especially those with the 64) seem to run somewhat hotter than previous production models. This tips the balance, at least in the case of these machines, so we recommend that you turn off a VIC or 64 and even unplug the power supply after each use.

A New Atari Graphics Mode?

I have been programming with my Atari 400 for almost a year now and have had a lot of fun with it. And recently, I have noticed advertisements in magazines about programs written in graphics mode 7.5. Is this a new graphics mode? If so, what does it and the other ".5" modes have over the others or GTIA?

David Brundage

There are no ".5" modes. GRAPHICS 7 is a 4-color mode with a horizontal resolution of 160 and a vertical resolution of 96. GRAPHICS 8 is the high-resolution, one-color (except through artifacting) mode with a resolution of 320h x 192v.

Built into the ANTIC chip is another mode that is not supported by the 400/800 operating system. It is a four-color mode with a resolution of 159h x 192v, the same vertical resolution as GRAPHICS 8. Since it is "halfway" between modes 7 and 8, it has been called GRAPHICS 7½ or GRAPHICS 7.5. You can turn a GRAPHICS 8 screen into this new mode by replacing

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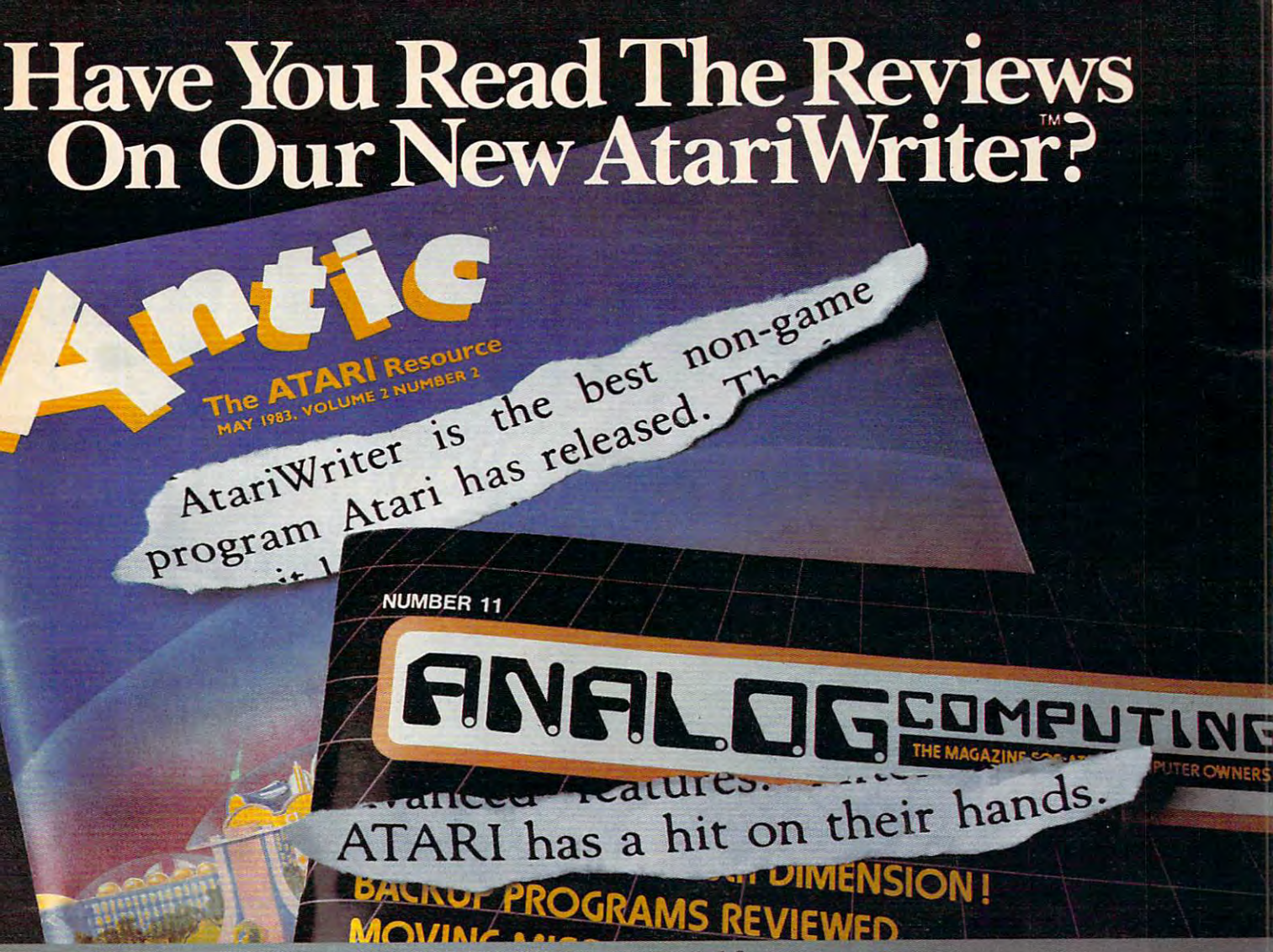

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all the 15's and 79's in the display list with 14's and 78's. (The hexadecimal code for the number 14, which is this mode's ANTIC number, is E, so GRAPHICS 7½ is sometimes called GRAPHICS E.) This will do the trick:

```
10 GRAPHICS 8+16:DLIST=PEEK(560)+256
   *PEEK(561)+4
20 FOR I=-1TO200:A=PEEK(DLIST+I):IF
   A=15 OR A=79 THEN POKE DLIST+I,A-
   1
30 NEXT I:POKE 87,7
```

If you want a text window, just remove the "+16" from line 10. The POKE on line 30 fools the operating system into thinking that you are in GRAPHICS 7. This lets you use only the top half of the screen with BASIC PLOTs and DRAWTOs, since the OS considers vertical numbers greater than 95 to be in error for GRAPHICS 7. The Atari 1200XL and all the new 600XL, 800XL, 1400XL, and 1450XL computers fully support this mode in the operating system and BASIC.

Sprites, SYS, And Storage On The 64

I have several questions about the Commodore 64:

First of all, I know you can check if a sprite has hit a background character by PEEKing (V+31) when V=53248. Is there any way to find out what kind of character it hit?

Second, I have seen many programs which read: 10 SYS(X). How do they do this? Using Commodore's assembler package, you must load in the machine language program off the disk.

Last, where is there room to insert machine language programs in memory other than C000 - CFFF (49152 - 53247)?

Matthew Price

The sprite-to-background collision detection byte (53279) is set up to be a "toggle" switch; in other words, it registers an off/on condition (collision or no collision). It does not offer the option of telling you what character the sprite collided with. However, you can program this option for yourself. For instance, after a collision has been detected you could branch to a subroutine that would convert the affected sprite's position to its screen position, and then perform a simple PEEK to see what character it hit.

The SYS command is used to start a machine language program running. When, in a BASIC program, you see a statement such as 10 SYS XXXX, the program is simply branching to a machine language routine much the same way that a pure BASIC program would branch to a BASIC subroutine via the GOTO or GOSUB command.

Commodore's machine language assembler is stored on disk. Like BASIC, machine language programs may be stored on either tape or disk and, once LOADed (by the LOAD command, or via a BASIC loader), it may be called or branched to at any time by the SYS command.

There are many places for you to safely place your machine language programs. Besides the obvious BASIC programming area (2048 to 40959), there are other good locations available: $02A7 to $02FF (decimal 679 to 767, 89 bytes), $033C to $03FB (decimal 828 to 1019 – the tape cassette buffer – 192 bytes), and, as you mentioned, $C000 to $CFFF (decimal 49152 to 53247, 4096 bytes).

Can An Atari VCS Run 400/800 Programs?

I just heard that a keyboard will be coming out for the Atari 2600. Are programs from Atari 400/800 compatible with this sytem? Do they have the same programming language, *not* software?

Frank Martone

Atari's new add-on computer keyboard, previously called "My First Computer," has been rechristened (with a few keyboard changes) as "The Graduate." The add-on module comes with a version of BASIC that is more like Microsoft BASIC than Atari BASIC. The Graduate was designed independently of the home computer line, so although some of the graphics are similar, The Graduate has no more in common with the 400/800 than it has with a Commodore VIC-20.

Atari Machine Language Graphics

I own an Atari 400 and would like to know how to change graphics modes in machine language. Also, I'd like to know how to change the background colors in the GTIA modes.

Bim Feysteryga

All the graphics routines you find in BASIC (GRAPHICS, PLOT, COLOR, DRAWTO, etc.) can be accessed from the operating system. Refer to Bill Wilkinson's "Insight: Atari" in the February 1982 issue. For complete information on the GTIA, you will find a series of illuminating articles in COMPUTE!'s First Book of Atari Graphics.

*The background color in GTIA modes 9 and 11 is, as usual, in color register four (SETCOLOR 4, POKE 712). In mode 9 you can only control the color, not the luminance, and the reverse is true for mode 11. The background color in GTIA mode GRAPHICS 10 is controlled by memory location 704. POKE it with the color multiplied times 16 and then add the luminance. Instead of SETCOLOR n,4,6 use POKE 704,4*16+6.*

COMPUTE! welcomes questions, comments, or solutions to issues raised in this column. Write to: Readers' Feedback, COMPUTE! Magazine, P.O. Box 5406, Greensboro, NC 27403. COMPUTE! reserves the right to edit or abridge published letters.

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Computers And Society

David D. Thornburg, Associate Editor

That's Not A Program, That's A Language

In the wild and woolly early days of personal computing (the late 1970s, to be exact), one of my favorite sayings was "That's not a game, that's a simulation!" Implicit in this saying was the idea that games were somehow not worth spending time on, but that the same piece of software took on extra value when viewed as a simulation.

A program to emulate a lemonade stand (in which the player experimented with advertising, pricing, inventory, etc.) could be viewed as a game (see how much money you can make in the shortest time) as well as a simulation (examine the effect of advertising on sales). But as time passed, the game/simulation controversy seemed to die away.

I have seen some recent developments that point the way to new types of software. I am speaking of application programs that are actually computer languages. This "language aspect" is sometimes so carefully hidden that it is likely the programmers themselves may not realize all the implications of their efforts.

This and next month's columns are devoted to a description of a few such "languages." Those of you who think computer languages are limited to BASIC, PROLOG, Pascal, PILOT, Logo, and the like are in for a surprise. I am presenting only a very small sampling of these languages, and by the time we are done you will be able to identify many others.

Before giving examples, it might be a good idea to list the essential elements of a language. A computer language must allow the user to create computer-based activities that are custom-tailored to the user's needs. The language must have a vocabulary and a grammar. The user should be able to edit his or her program and to "run" it. All the languages I will describe interpret the user's programs and are highly interactive both in their programming style and in the types of programs that are created.

VisiCalc As A Language

VisiCalc (a product of VisiCorp) is an example of what is called an "electronic spread sheet." This program allows the user to create tables of data and relationships between certain pieces of data. As the data is entered into the spread sheet, calculations are made automatically to fill in the areas of the sheet containing the "results." The ability to play "What if?" games by quickly seeing the effect of changes in the data has made VisiCalc and its kin invaluable tools for today's computer-using executive.

Electronic spread sheet programs are computer languages.

If you find this surprising, look at how they are used. The user creates a "mask" for the spread sheet (the program). This mask contains the labels for the rows and columns of the matrix, the relationships between data in the various entry cells, and any fixed data that the program might need. This mask can then be saved for later use, or for use by someone other than the programmer. A VisiCalc mask for tax forms, for example, can be used by millions of taxpayers, each of whom would enter his or her own data and let the spread sheet calculate the results.

Interestingly, "programming in VisiCalc" doesn't require a knowledge of anything like a "normal" computer language. It doesn't matter if you program the labels first, or if you create some of the row and column relationships (e.g., making the contents of each entry in column C the product of the contents of each entry in column A and column B) and then fill in some data. The programmer has access to the whole program at once and can try out bits and pieces as he or she moves along. If writing programs in BASIC can be considered a "serial" process, programming in VisiCalc is a "parallel" process.

It is this radical departure from traditional programming styles that makes VisiCalc interesting to me as a language. Philosophers have long maintained that what we think is influenced by the choice of language in which we express our thoughts. That many hundreds of thousands of business people seem to be better "thinkers" with the aid of programs like VisiCalc is testimony to the power of this language.

Rocky's Boots As A Language

The Learning Company is well known for its high-quality educational software and for its special emphasis on the development of logical thinking skills. Hidden among its application software packages is a computer language called Rocky's

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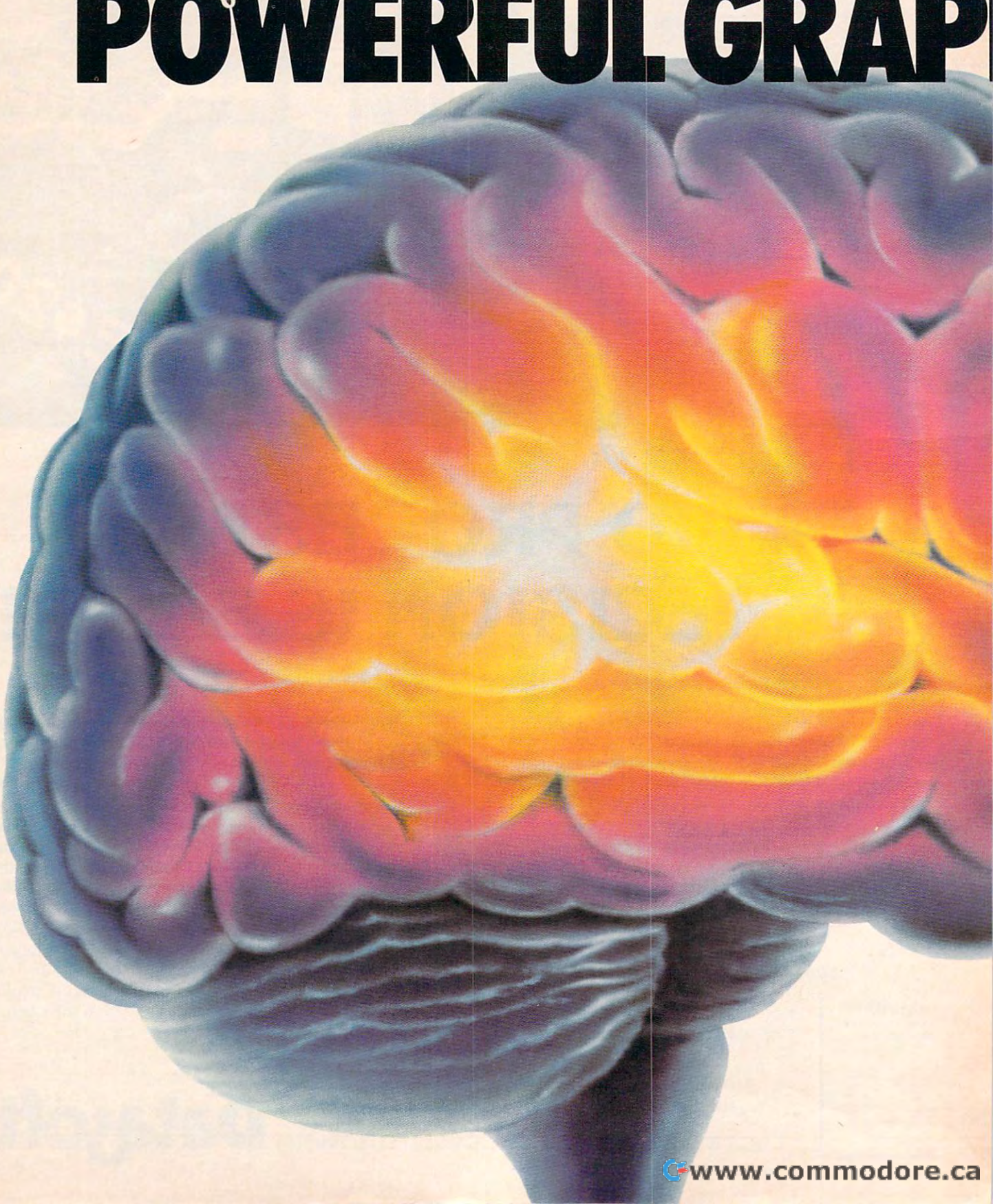

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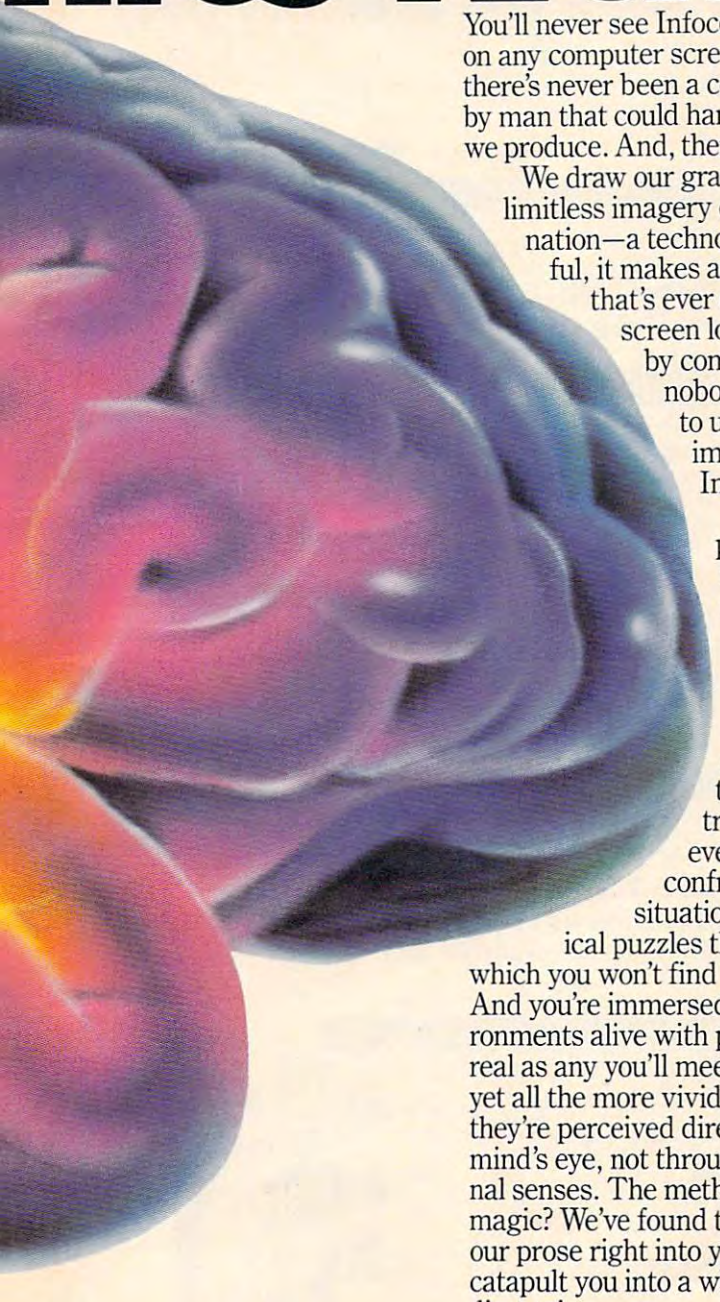

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Figure 1: OR Gate Connected To Clapper

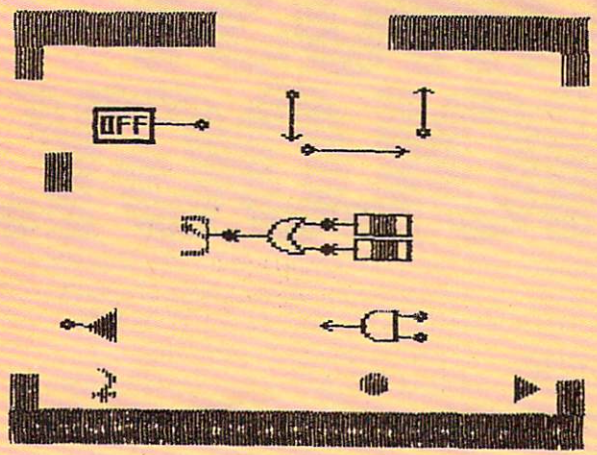


Figure 2: Knife Cuts Clapper From OR Gate

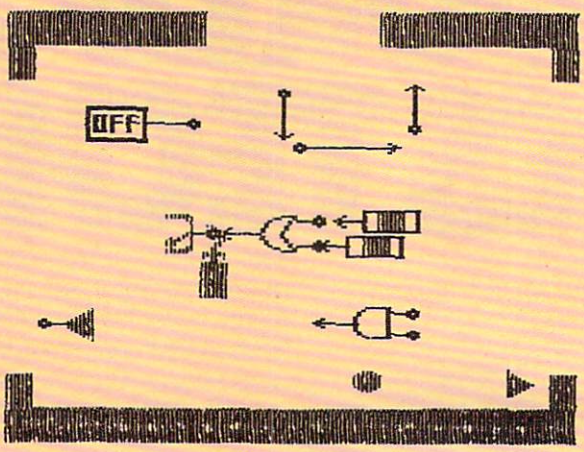


Figure 3: Clapper Replaced By OFF/ON Box

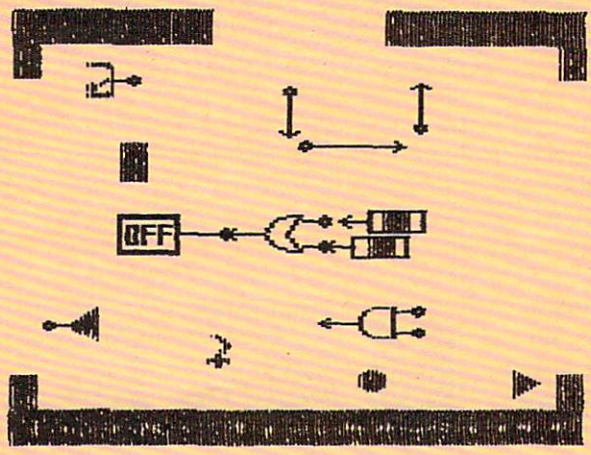


Figure 4: AND Gate Connected To Machine Shown In Figure 3

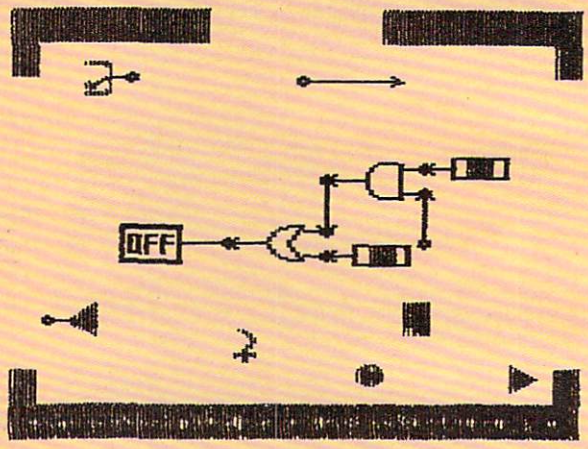


Figure 5: Completed Machine In Use

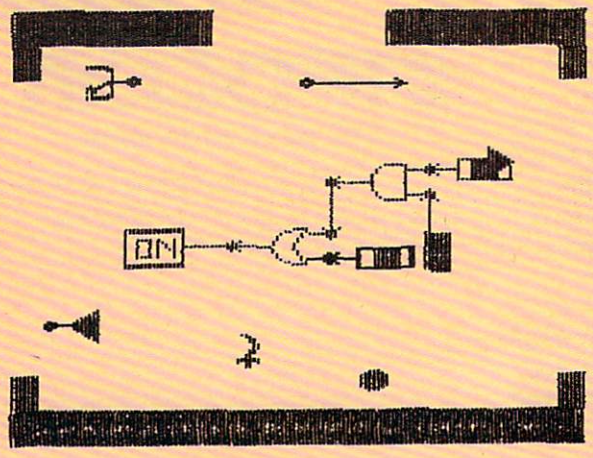
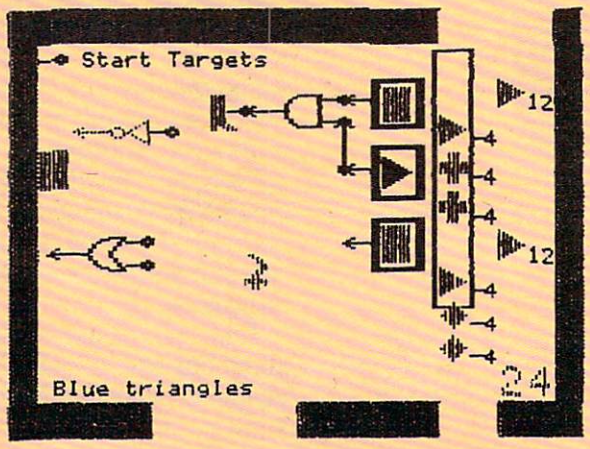


Figure 6:
The Machine Used To Identify Blue Triangles (Solving A Problem In Logic)



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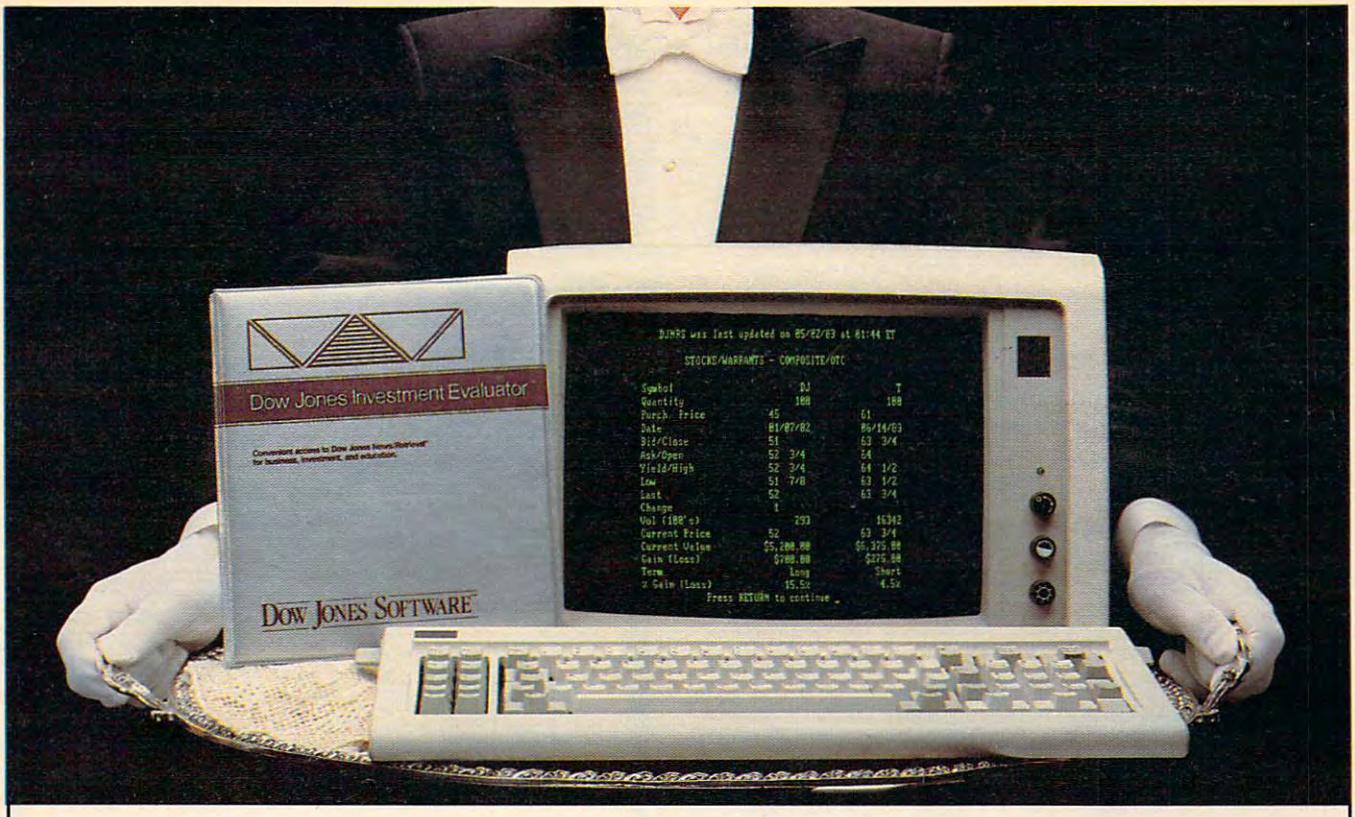

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Boots. This language assumes the guise of a program designed to let the user solve logic problems by building "logic machines." These logic machines are, in fact, schematic diagrams constructed from AND, OR, and NOT gates, flip-flops, wires, input sensors, and output devices. Through a series of carefully staged exercises, the user is taught how to use the program (or, as I claim, how to write programs in the Rocky's Boots language).

Interestingly, the construction of logic machines (this is the programming task) can be done without access to the keyboard by using a joystick to pick up objects (program subroutines) and interconnect them into a complete machine (program). Incorrect connections can be "cut" with a special knife (the editor). The only frustration I have encountered with this language is that no provision was made for the saving of finished "machines."

The figures show how a program can be edited in Rocky's Boots (remember that a machine is in reality the computer program you have created). Figure 1 shows a machine consisting of an OR gate connected to a clapper. One of the OR gate inputs is a blue sensor, and the other is a green sensor. The remaining items in the picture are "spare parts" (i.e., subroutines available for use). Suppose you want to change this machine into a new one that will turn the word OFF to ON if the green sensor is activated OR if both the blue sensor is activated AND the cursor is touching an input.

To modify the machine, the cursor (shown as the large solid rectangle) is used to pick up the knife shown at the bottom-left side of Figure 1. In Figure 2 the blue sensor has been cut, and the knife is shown cutting the clapper from the OR gate. In Figure 3 the clapper has been replaced by the OFF/ON box, and in Figure 4 the AND gate and some wires have been connected to complete the new machine. Figure 5 shows what happens when the machine is used and the proper conditions are satisfied (in this case, both the blue sensor and the remaining input of the AND gate are activated).

Rocky's Boots is similar in many ways to VisiCalc. The user has access to the whole program at once (it is a parallel environment), and the program (the machine) can be tested as it is being built. Of course, the application areas for these programs are quite different from each other.

The machines created by Rocky's Boots are designed to be used to solve logic problems. Figure 6 shows one such problem in which a machine has been built to identify blue triangles.

One can argue that Rocky's Boots is a game, a simulation, and a language.

No matter what it is called, it is a very powerful piece of software.

Next month we will conclude this series with the description of yet another powerful program/language, Dancing Bear from Koala Technologies. We will also discuss the potential impact of these types of languages. ©

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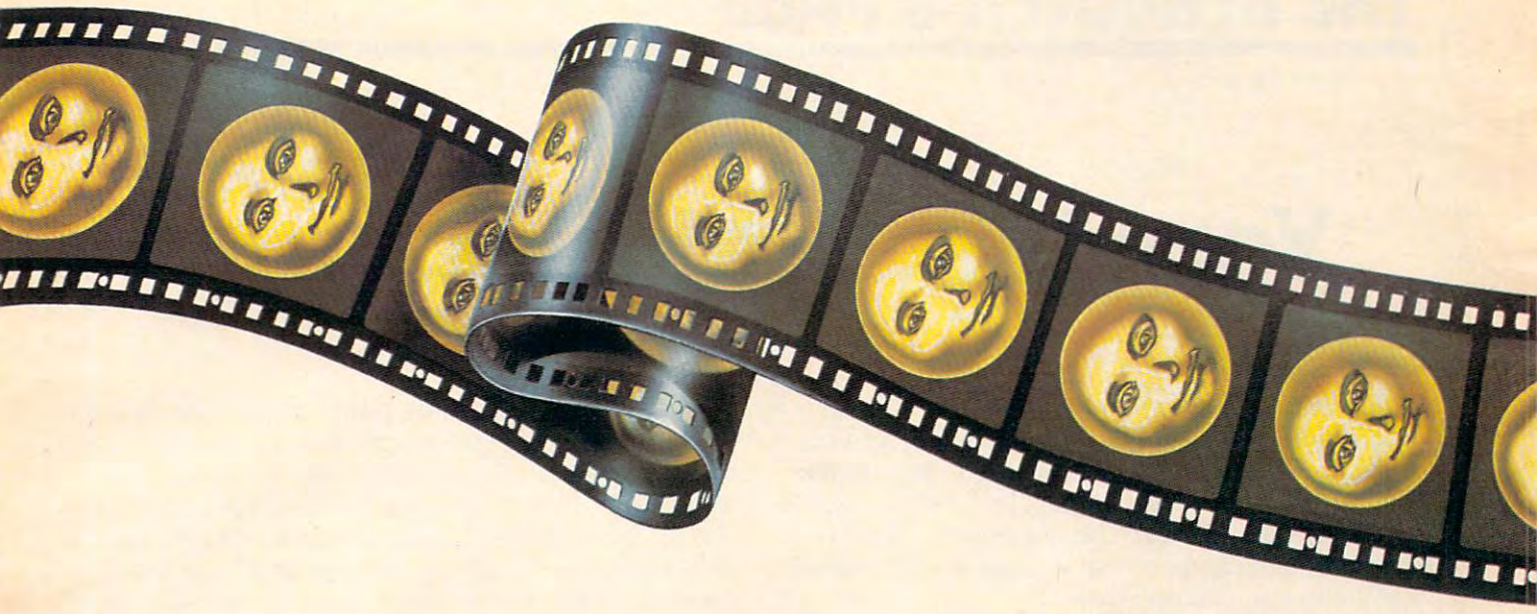

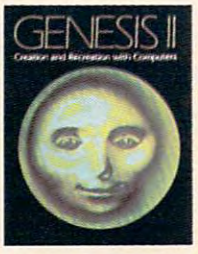

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THE BEGINNER'S PAGE

Richard Mansfield, Senior Editor

Your First Useful Program

It doesn't take long. Soon after you buy a computer, someone will ask what it's doing for you that's *useful*. You've been learning to program in BASIC, but what practical results have you got to show for your efforts? The questioner might be a friend or even someone in your immediate family, someone you usually love.

Here's a program which can be used in dozens of practical ways. It makes it easy to store and analyze information. We all keep lists and records. If you have a collection of something – recipes, books, stamps, albums, whatever – you can enter all sorts of information into this program and then look things up later in a variety of ways. You can ask for everything starting with the letter A, everything on a particular topic, from a particular country, or whatever specifications you want. This type of program is often called a *data base manager*. It's one of the most effective, impressive applications for a personal computer.

How To Modify The Program

A similar program was published in this column two years ago and proved popular. I received this letter the other day:

> *I would like to ask a favor. I have been using your program "Searching Files" (November 1981) for some time, and very much appreciate it. But I've tried without success to add categories like 3. Publication, 4. Date. If possible, could you explain how to expand the program to include additional categories?*
>
> *Mel Leiserowitz*

That a programmer can make modifications to a program is one of the most subtle, but powerful, aspects of computing. Unlike other kinds of tools, a given computer program can often be radically transformed so that it can accomplish a great variety of tasks. Let's take this program apart, looking at each aspect of it, and then explore how to modify it to include extra categories.

Data base management is frequently divided into two phases: the manager program and the actual base of data. A *data base* would be a list of pieces of information, perhaps in alphabetic or some other order, like the phone book. The data base is often stored on a tape or disk, and the manager program looks up information by opening and closing files on the tape or disk. The second phase, the manager program, can make all kinds of lists for you; it can analyze the data base. For example, if the yellow pages were on a disk, you could write a program which would allow you to ask highly specific questions. You might want to know the phone number of all pizza shops within a five-mile radius of your house. If the data base included map information, the manager program could give you the answer.

A Faster And Easier Way

This program, "The Filer," combines the data base into the manager program in the form of DATA statements, each holding an individual record. The advantage of this is that you can add to and modify the data easily, on screen. It's also faster: the computer doesn't need to bring data in from tape or disk. The program contains the data already. The disadvantage is that your data base cannot be larger than the amount of memory in your computer. You should be able to find many uses for this program, however. If your computer has 32K of RAM memory, you can store detailed information about all the articles in COMPUTE! for any given year. If you want to start a data base for a new year, you can simply use the program again, with a new set of DATA statements. In our example use of The Filer we'll start a cross-indexed reference file of all COMPUTE! articles.

The program is designed to work on all computers using Microsoft BASIC (Commodore, Radio Shack, TI, Apple, etc.). If you have an Atari, there's a version for your machine in COMPUTE!, November 1981.

Let's go through the program to see how it works:

Line Number

1 This lets the computer know the total number of items in our data base. T = 10 because we've got ten DATA lines in this program. The data base starts at line 502 and continues to the

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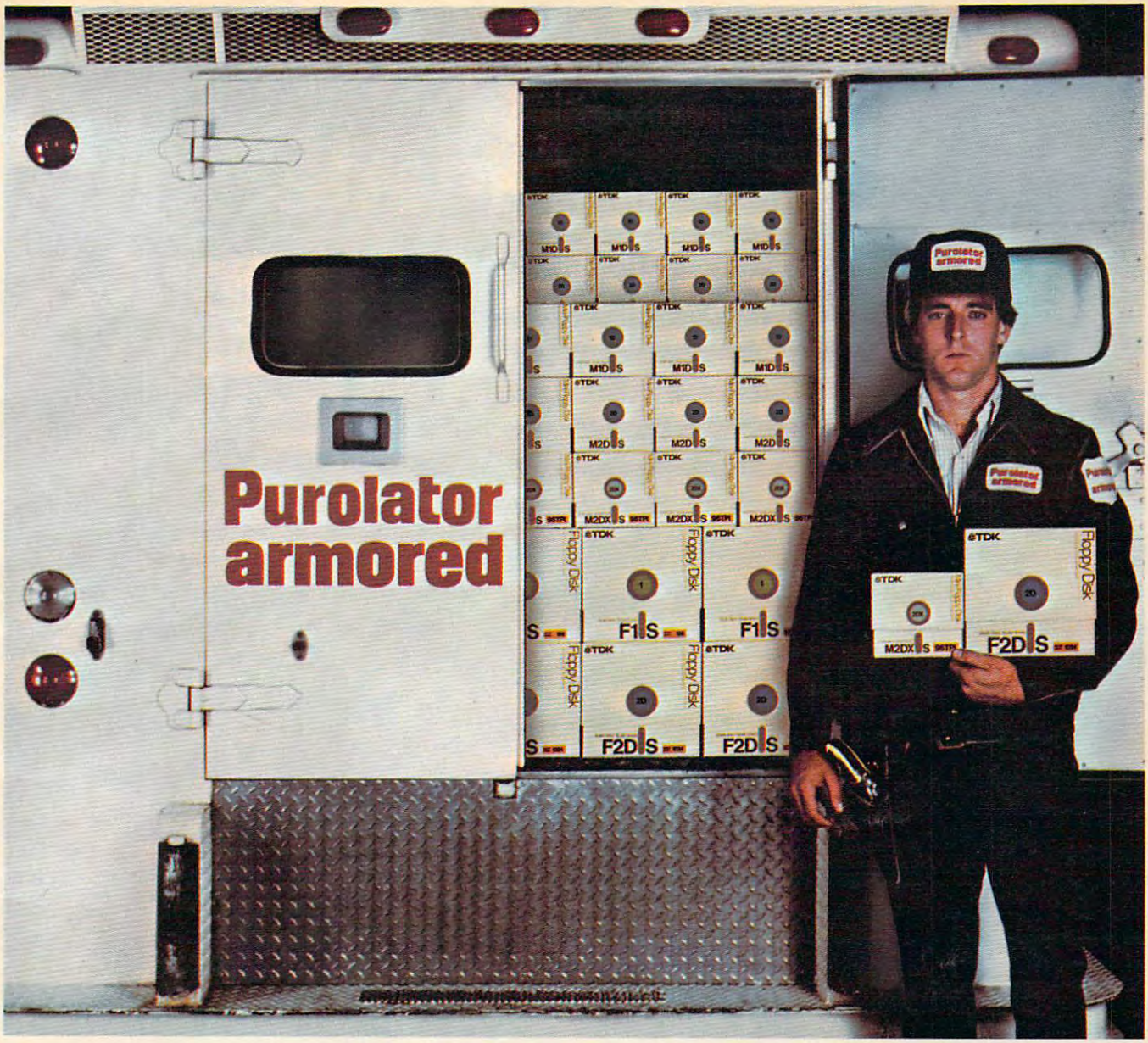

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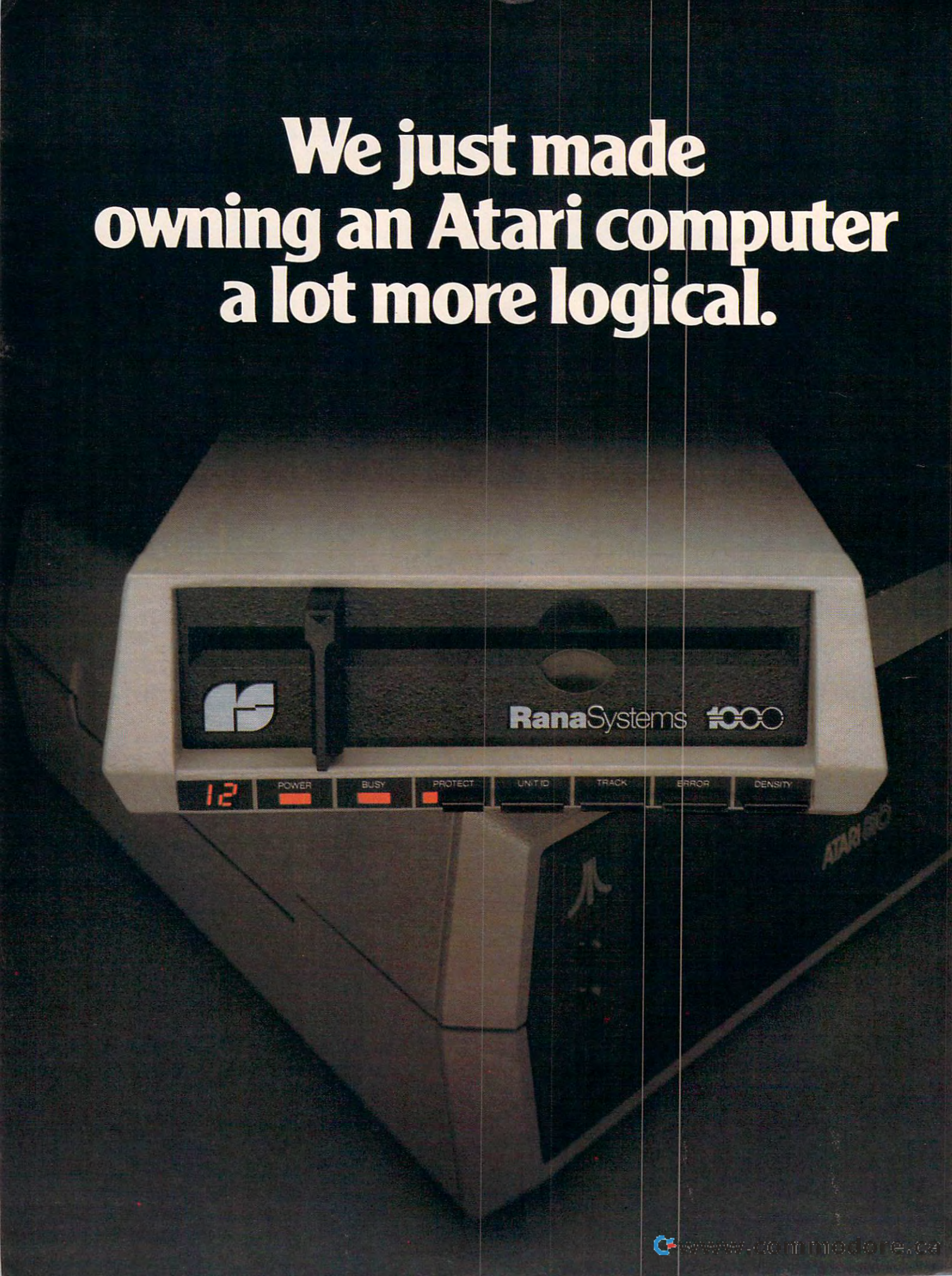

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end of the program. If you add 400 more DATA lines, you should change line 1 to read: T=410.

2 Since reading a large data base might take some time, this statement appears on screen to let the user know that the computer is busy and will return control to him or her shortly.

3 Here we DIMension the three variables which will be holding our data. These tens, too, would need to be changed to 410s if you added 400 more DATA lines.

10 The computer assigns a special variable name to *each* item of data by READing through the entire list. We've got three categories per record. A$(? – whatever I= during the READing) will be topic identification for the COMPUTE! articles in our data base. B$(?) will contain the issue number and the page number. C$(?) holds the author name.

15-45 Here the computer gives us a choice. We can look things up either by topic or by author.

50 We now make our request. If X=1 (see line 35), then we're after the author so we're sent down to line 70, which searches through C$( ). If not, we proceed to line 55 for a search of A$( ), topics. Lines 55-65 and 70-80 are identical searches, except one looks at C$( ), the other at A$( ). Since they're the same, we'll just examine the interesting pattern-matching technique where it appears the first time, in line 60.

60 This is the heart of the program. It's the trick that lets you look things up without knowing their exact names. It also makes possible varying *depths* of specificity. If you add a data line: 522 DATABASIC MEMORY SAVING, you can then request anything from B to BASIC MEMORY SAVING and this item will show up on the list. If you request matches to BASIC, you'll get this one and line 510. If you request BASIC MEMORY, line 510 will be ignored.

How does it work? N$ is the word or words you entered (line 50) and to which you want all matches. A$(I) will scan through the entire data base "topics column." For a match to take place, only the leftmost part of A$(I) needs to match N$. Z does this for us; it's the length of N$ (see line 50). That is, we're looking for matches from pieces of A$(I) only as big as N$. So, you type in your topic DATA with this in mind. Enter each record so that the first word is the most general, the second more specific, etc.

85 This subroutine prints out any matches which are found. It contains descriptions of the categories. There are a number of ways to format such things. You might prefer, for example, to list the category titles only once, at the top of the screen, and then list everything in columns underneath them.

Expanding The Categories

As you can see by following the changes suggested in Programs 2-4, some minor structural modifications are necessary to make Program 1 handle a fourth category, Computer brand. However, it would be simple to add a fifth or more categories to this new version.

One thing to watch out for: the READ statement doesn't care what data is on a given DATA line. It reads things very literally and checks for commas (or the end of a line) to tell it that a particular item has ended. So, if you get odd responses such as EDUCATION when you're asking for author names starting with E, or an OUT OF DATA ERROR – you've probably left out a comma somewhere in the DATA lines. Also, your DATA lines will be longer with this new, four-category, version of The Filer. They'll now look something like this:

```
520 DATALANGUAGES PILOT,1/40,THORNBURG,VIC
```

If you have any questions or topics you'd like to see covered in this column, write to "The Beginner's Page," COMPUTE! Magazine, P.O. Box 5406, Greensboro, NC 27403.

Program 1: The Filer

```
1 T=10:REM{8 SPACES}  TOTAL NUMBER OF
  ITEMS OF DATA
2 PRINT"{3 SPACES}READING{5 SPACES}COMPU
  TE!{5 SPACES}DATABASE
3 DIMA$(10),B$(10),C$(10)
10 FORI=1TOT:READA$(I),B$(I),C$(I):NEXT
15 PRINT:PRINT"SELECT A CATEGORY":T$="TO
   PIC"
20 PRINT"{4 SPACES}1. AUTHOR
25 PRINT"{4 SPACES}2. SUBJECT
30 K$="":GETK$:IFK$=""THEN30
35 X=VAL(K$):IFX>2THEN30
40 IFX=1THENT$="AUTHOR'S NAME"
45 PRINT"{3 SPACES}PLEASE ENTER "T$
50 INPUTN$:Z=LEN(N$):IFX=1THEN70
55 FORI=1TOT
60 IFN$=LEFT$(A$(I),Z)THENGOSUB85
65 NEXTI:GOTO15
70 FORI=1TOT
75 IFN$=LEFT$(C$(I),Z)THENGOSUB85
80 NEXTI:GOTO15
85 PRINTA$(I);"...IN ";B$(I);" (ISSUE#/P
   AGE), WRITTEN BY ";C$(I):RETURN
498 REM
499 REM
500 REM *** TOPIC OF ARTICLE -- ISSUE/PG
    -- AUTHOR ***
502 DATABUSINESS,1/4,SAWYER
504 DATASORTING,1/7,HULON
506 DATAWORDPROCESSORS,1/13,LINDSAY
508 DATASCIENTIFIC INSTRUMENTATION,1/24,
    BYRD
510 DATABASIC TOKENS,1/29,HERMAN
512 DATAMODEM,1/30,TULLOCH
514 DATAA-D CONVERTER,1/31,HERMAN
516 DATAML MEMORY TEST,1/32,MOSER
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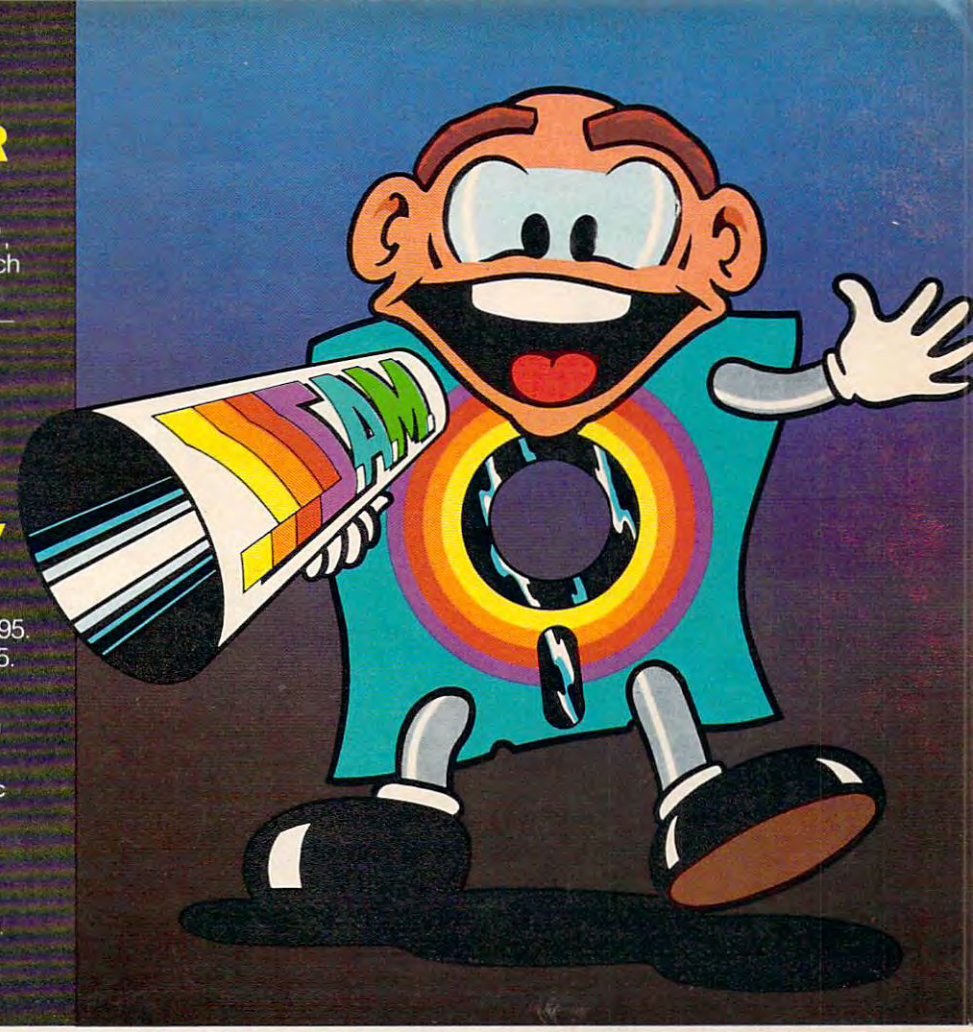

Program 2: Change These Lines

```
3 DIMA$(10),B$(10),C$(10),D$(10)
10 FORI=1TOT:READA$(I),B$(I),C$(I),D$(I)
   :NEXT
35 X=VAL(K$):IFX>3THEN30
50 INPUTN$:Z=LEN(N$)
55 FORI=1TOT:ONXGOSUB60,65,70:NEXTI:GOTO
   15
60 IFN$=LEFT$(C$(I),Z)THENGOSUB85
65 IFN$=LEFT$(A$(I),Z)THENGOSUB85
70 IFN$=LEFT$(D$(I),Z)THENGOSUB85
```

Program 3: Add These Lines

```
26 PRINT"{4 SPACES}3. COMPUTER
42 IFX=3THENT$="COMPUTER"
61 RETURN
66 RETURN
71 RETURN
```

Program 4: Drop These Lines

```
75 IFN$=LEFT$(C$(I),Z)THENGOSUB85
80 NEXTI:GOTO15
```

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TELEGAMES

Computer Games By Phone

John Blackford

A new species of game is suddenly gaining in popularity. It's the telegame – played over the phone lines. In some versions, you play against the computer; in others, many players can join in a single game. When one player makes a move, the others see it almost instantly. Such games allow team efforts and that opens up an intriguing new set of possibilities.

In the movie *WarGames*, a high school student accidentally taps into NORAD's war-game computer. The computer, which is equipped with artificial intelligence programs, is prepared to play such favorites as chess, tick-tack-toe, and global thermonuclear war. After the student chooses the latter, the computer won't quit, seizing control of launch codes and missile silos in preparation for a real nuclear strike.

How did the student bring about this near disaster? Practically the same way that people around the country now call up computerized information services and use them to play games: he put his telephone receiver in a modem – a device connecting the computer to the phone lines – readying his computer to call another computer.

Many information services contain – among other things – a library of games, which people can call up and play. In some, users play against the computer, as in *WarGames*. In others – the multiplayer, interactive games – the computer acts as a referee, doing the housekeeping chores, accounting for players' moves, and generally running the game. At present, interactive gaming is available only from CompuServe Information Service, though The Source and Delphi are working to catch up.

Only At Lunch Hour

CompuServe got a head start in interactive games by chance. The company began as a data base for business users, offering stock market quotes, sugar futures quotes, and the like during the day. After a few years of setting up such services, Russ Ranshaw, one of the company's programmers, decided to create a simple space-war game called Space Wars (SPCWARS) for the recreational use of other employees.

"It seemed like a logical thing to do," he says. "But it got so darned popular that people were playing all the time." After looking the other way for some time, company officials eventually limited game access to lunch hour. Even that didn't do the trick, so finally, in 1976, the game was completely banned from CompuServe – and it wasn't to be found in the memory banks for several years after that.

As personal computers began reaching homes in increasing numbers, planners at CompuServe (and other information utilities) decided to make their services available to home users at reduced rates during off-hours. To make the service attractive to non-business users, some new features were added. One of the first was SPCWARS, and it proved just as popular as it had been during lunch at CompuServe. In fact, it and two other interactive space games added later are now among the most widely used parts of the system.

SPCWARS is fairly simple to play. The commands aren't hard to follow, and a *help* function permits you to learn the rules as you play. It's an interactive game in which everyone is gunning for any player who signs onto the system. You can hide in clouds, duck around stars, and even display the section of the galaxy your ship is probing. Since true graphics aren't possible, the display consists of various symbols and letters to designate the location and direction of your ship and the other objects in the game. As more people

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sign onto the game, the size of the playfield expands, and if the number of players gets unwieldy, the host computer starts a new game for the newcomers.

No Help In Sight

Two other currently available interactive games are exceedingly complex. Forget trying to learn them as you go. Before you even figure out how to move your ship, you'll see a long string of messages race across your screen. You are under attack. The *help* command no longer works. You may notice the coordinates of the attacking ship and attempt to direct some phaser fire his way. But suddenly it's over. As you try to figure out what happened, you'll get a message like, "Sorry, Cadet, you're dead. You didn't cut it in MegaWars."

Save yourself some embarrassment – and wasted time – and order the instruction book before trying to play this one. You can order on-line (through your computer) or by writing CompuServe direct (5000 Arlington Centre Boulevard, P.O. Box 20212, Columbus, OH 43220).

DECWARS was the first really complex interactive game. It's actually a revision of a space game that had been residing for some years on a mainframe at the University of Texas. Ranshaw got it and worked obsessively to get rid of all the bugs. The task proved more than he had bargained for, and he now thinks he could have done the whole thing from scratch in less time. Still, reaction was favorable, right from the start. Players signed on again and again to play. A special interest group (SIG) was even formed for DECWARS fans. Users would use a special area of CompuServe to exchange comments and ideas about the game.

Some of these players began suggesting improvements, and Ranshaw got in touch with them to refine the concept for an improved game. In both games, players can form teams, but the regulars thought MegaWars – the upgraded version – should also assign ranks based on past performance. This would reward ability, yet allow beginners to fly more durable ships, increasing their survival time immensely.

After a long development – marked by enthusiastic suggestions from nearly everyone – the game went on-line. Immediately, CompuServe was flooded with suggestions for improvement. People would sign on the DECWARS SIG and fill the screen with criticisms. It became a significant problem.

After that experience, Ranshaw says they all realized that while suggestions are great, there comes a time when the programmer simply must do what seems best, letting others decide whether the game's fun to play. In spite of criticism by DECWARS fans, MegaWars went on to become highly successful. At present, it is CompuServe's second most profitable offering – behind a simulation of CB radio that permits people around the nation to sign on and chat.

Old Favorites

Although CompuServe has the only interactive games right now, traditional favorites played against the computer are popular on all systems. Other information utilities, such as The Source, Dialog, and Delphi, also offer single-player games on-line. There are adventure-type classics such as *Wumpus*, *Star Trek*, and *Zork* as well as computer versions of such popular games as *Othello*, backgammon, and even chess. Most of the companies also offer card games, roulette, and dozens of other brain teasers.

To supplement such traditional games, The Source and Delphi have their programmers working hard to complete several multiplayer games. The Source isn't saying what titles it's creating, but Delphi is finishing up two space games, *Conquest* and *Parsec*, and will introduce more fantasy-oriented fare, too: *Scales of the Gods*, a medieval adventure, and *Timelords*, a game which involves exploration of "the fourth dimension."

As Delphi tried to hammer these into shape, its own users beat it to the punch, creating several multiplayer games right on the system. One player, known as the "Dragon," served as dungeon master for a couple of adventure games. The players took advantage of the bulletin board and electronic mail services to create the games. Now Delphi has made special space available for the game devotees. Though these adventures have generated excitement, they aren't *programmed* games. Instead, it's the players themselves who make things happen. Users create their own story, using the dungeon master to communicate with others. That's actually part of the idea at Delphi: the service should change to reflect the needs of users. Says president Wes Kussmaul, "Delphi is almost a creation of the users – they are the ones who bring it to life."

Interactive Games

What is it that makes interactive games hard to create? According to Ranshaw – and he's built every one that's commercially available – they require tricky programming with built-in safeguards to protect the game when someone drops out. Says Ranshaw, "What if you are playing a four-card game, and one player's cat knocks his modem off the table, disconnecting the phone? Suddenly the player is gone. Do you step in with the computer and have it play for the missing person, or bomb the whole game?"

The ideal, according to Ranshaw, is to minimize computer involvement. But in a case like the example above, the program would have to take the missing hand. Delphi's Kussmaul has a different philosophy, noting that if you are playing a real game of bridge, and someone walks

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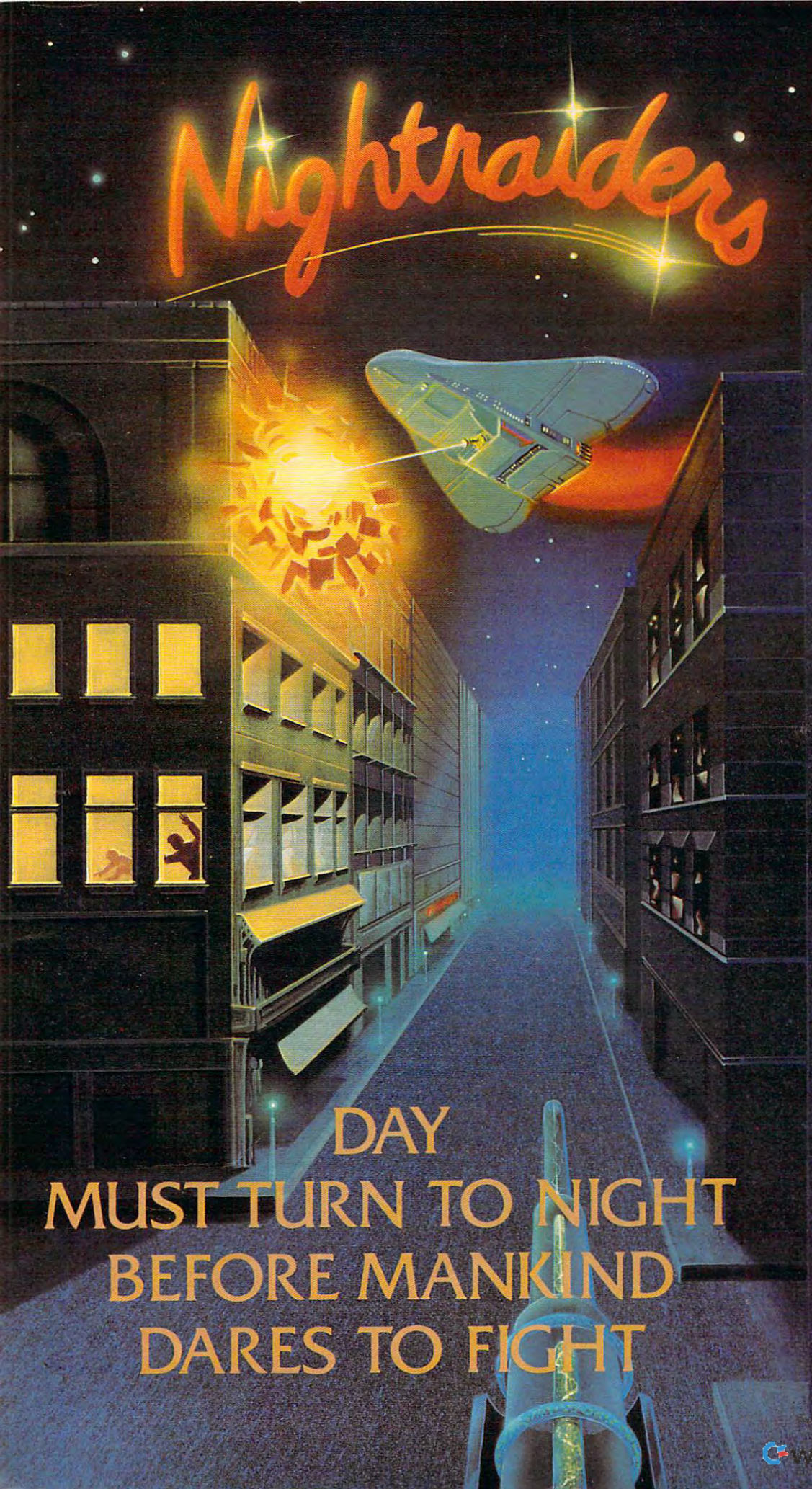

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off, the game is over. The same should be true of interactive computer games, he thinks.

A tougher problem arises with multiplayer games such as MegaWars. If the program isn't properly done, the game can crash when one player pulls out, destroying what may be hours of effort for some of the players. To prevent this, each player is considered to be a separate "case" by the host computer. The game program controls each player's input individually. Thus, if someone drops out, his or her specific case is closed, but the game data remains intact.

Graphics To Come

All the games currently available through information utilities are done in alphanumeric characters. Whatever you see on the screen could be typed on paper with a standard computer printer. In the early days of telecommunications, a set of standard characters, called the ASCII code, was developed to improve the service beyond that available on teletype machines. ASCII permits upper- and lowercase letters plus punctuation marks and a few control codes. The graphics characters on home computers aren't standard ASCII. Since information services must be able to communicate with many different computer brands, they are limited to the ASCII character set.

That could change, however. Developers at CompuServe are trying to create telegames with movable graphics. Besides the differences between computers, the limitations of the phone lines themselves hinder graphics transmission. Although baud (bits per second) rates of 1200 or higher are possible, modems capable of such speeds are still fairly expensive. Most home users communicate with information utilities at a leisurely 300 baud, far too slow to permit movement of graphics on your screen. But the people at CompuServe are working on a way to get around this bottleneck.

They are attacking the problem in two ways: first, by creating software for each computer type, and second, by devising ways to transmit graphics information without actually having to transmit the entire picture. Most videogames consist of a background design (the playfield) and objects that move within it. CompuServe's game designers hope to define the playfields and graphics shapes and download the definitions to the user. Then, the host computer only needs to transmit enough information to move the predefined shape. Software purchased by each user will make the graphics information compatible with his or her particular computer.

New Directions

Such efforts may be only the beginning. With inexpensive modems and software now available, more and more home computerists are reaching information sources. And such organizations have found to their surprise that there's a healthy profit in home-oriented services. A company by the name of Gameline even has a plan to sell plug-in cartridges to allow Atari VCS game machines (11 million are presently in use) to download game software. And parents will have a special code enabling them to limit their children's use of the device.

In fact, activity could become so widespread that phone lines might be filled up with people using personal computers plugged into various data bases, including teletex, on-line bulletin boards, and even users chatting directly to one another. Bell telephone researchers are reportedly concerned that the entire phone network could become overloaded if market penetration of telecomputing services reaches as little as 3½ percent.

To avoid these problems, alternatives such as cable TV and local communications networks may be used. The Games Network is planning to offer a cable channel dedicated to videogames. Sytek, in cooperation with General Instruments Corporation, plans to introduce a series of local, high-speed communications networks using cable TV lines. These would be cheaper than comparable ones offered by American Bell, and would be compatible with personal computers. Such a system could support extensive graphics, because of the large transmission capacity of cable lines.

Whichever specific projects eventually succeed, the prospect is for more and better computer games played over the communication lines. Just as home computers changed in only a few years from hobbies to mass-market items, telegaming is now poised to be the vanguard of a massive upsurge in computing by phone. ©

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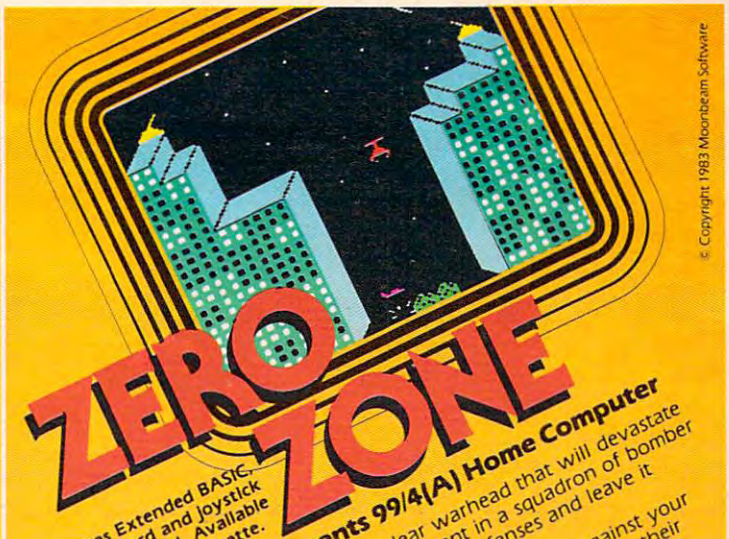

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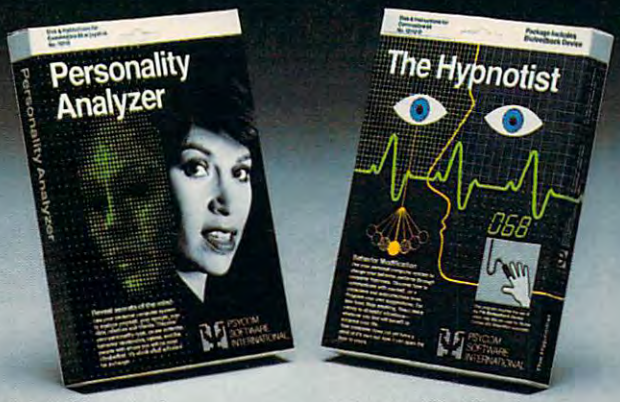

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NONVIOLENT GAMES

Kathy Yakal, Editorial Assistant

The violence that is inherent in many of today's video games is disturbing to some people. Others don't see it as a negative influence; they stress the positive aspects of playing and programming video games. In this article, we explore both sides of this controversial issue, and look at some software designers who are providing alternatives to typical arcade games.

VIDEO GAMES (see Murder)

This entry can be found in *The New York Times Index* for January 1-16, 1983. The article alluded to is a small item in the January 9 *Times* about a high school senior in Dallas who was "shot to death in the parking lot of an arcade after a quarrel over 75 cents worth of video display games."

It's not so unusual anymore to hear about someone being killed over something rather trivial. But what might make this act of violence significant to some people is its relationship to video games.

Video games embody competition. In order to win (and it's a temporary victory), you have to shoot down spaceships or gobble up something or rescue creatures in peril. Meanwhile, someone or something is always after you, trying to destroy you.

Does this mean that a long afternoon at the *Asteroids* machine will make you want to inflict bodily harm on the first person who gives you a funny look? Some studies have shown that a person's blood pressure will rise and pulse quicken after playing video games. But can't the same thing happen when you're up to bat in the big softball game or trying to meet an impossible deadline at work or even watching a frightening movie?

Game As Villain

The 1969 rock opera *Tommy*, by The Who, is the story of a young deaf, dumb, and blind boy who is a champion at the pinball machines. He becomes a cult hero as a result of that and, after he regains his senses later in the story, is worshipped by devoted followers who try to emulate his pinball wizardry.

If *Tommy* were written today, we might be humming along to "Pac-Man Wizard," instead of "Pinball Wizard." Ever since the introduction of Atari's *Pong* game in 1972 and the ensuing evolution of the video arcade game, these high-tech pinball machines have been showing up in cameo roles in movies and television. And they're usually the bad guys.

In this year's *The Star Chamber*, lawyer Michael Douglas can't even get a "Hi, Dad" from the kids because they won't turn away from their home video game. A fight over an arcade game that causes television interference in a restaurant gets a young woman involved with a young boy who does nasty things to people he doesn't like in *Twilight Zone: The Movie*. And *WarGames* follows the activities of a teenager who almost instigates World War III by tapping into the national defense system with a home computer, a modem, and some big floppy disks. Worse than that, he's flunking biology.

It's not just the computers themselves that are shown in a less-than-positive light. The player's involvement with the computer or arcade game, as portrayed by movie makers, usually points out some kind of character flaw that is intensified by his obsession with these high-tech villains.

Movies may not be the best way to gauge a society's attitudes, but they often reflect sources of conflict which are easily identifiable. And video games certainly seem to be that right now. You might be hard pressed to find a young person who doesn't have an opinion about *Donkey Kong*, or who couldn't at least hum the theme song.

Teaching Disassociation

There does seem to be a degree of backlash against video games. Joseph Weizenbaum, author of *Computer Power and Human Reason* and Professor of

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Computer Science at the Massachusetts Institute of Technology, has an explanation for why the backlash exists. "The video arcade is the modern version of the pool hall. Some people are opposed to them for the same reasons they opposed pool halls. This reasoning is not relevant, and it masks other things that are much more important.

"It's just as Marshall McLuhan predicted: the next medium takes aspects of the previous medium. In this case, video games have taken the worst of television: its mindless violence, which is expressed in all the shoot-em-ups." Weizenbaum cites the television show "Knight Rider" as an example. "It's not that that one is exceptionally violent. It just exaggerates the cartoon-type violence."

Then why don't parents get as upset over cartoons as they do video games? Weizenbaum doesn't know. "It's the same thing you see during the week on regular TV shows. Only the television acts as babysitter on Saturday mornings," he says.

Some people claim that, even though video games may be as violent as television, they are more interactive. "The advertising claim for video games is that you can actually participate. But what is it that you're actually participating in? Killing. You can't win — all you can do is survive longer than anyone else."

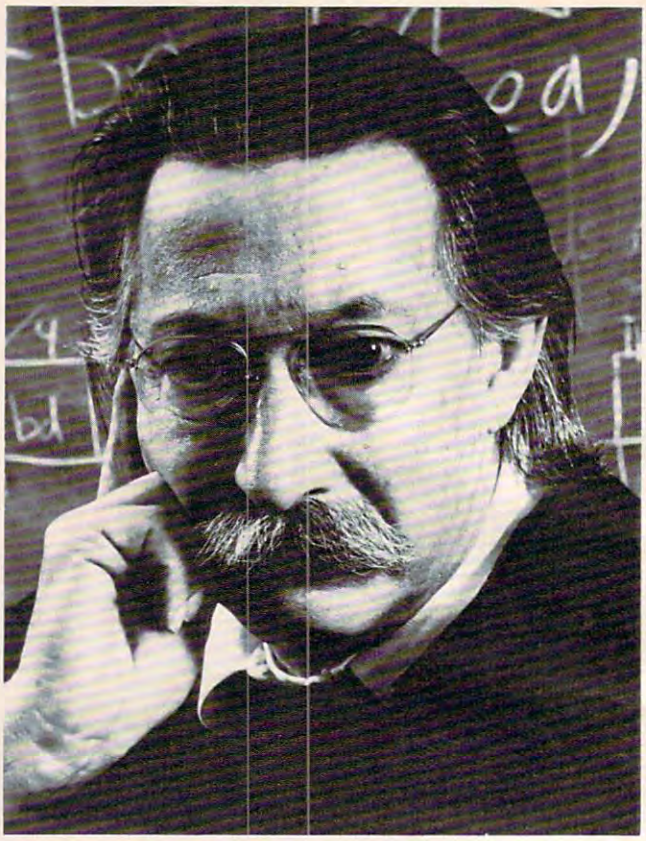
Weizenbaum's chief criticism is that what's being practiced in video games is disassociation. "Video games encourage you to believe that there is no relationship between what you are doing and the ultimate victim of that action. The crucial thing is that these are lessons in what it is necessary to do in order to survive in this society. In some sense, that's really the social purpose.

"It's like women working in a bomb factory. If they couldn't disassociate themselves from what they were doing, if they were really aware of what they were actually doing, they couldn't do it," says Weizenbaum. "The same thing applies to students and teachers who believe that artificial intelligence is possible. It's very necessary in this society to render a great many things abstract, to take them out of context."

Because of this, he believes, the video arcade is a "necessary and useful training ground. The video game is *not* the cause of this societal trait; it is a reflection of what our society is. It would be a mistake to yell and storm at the reflection."

Lack Of Creativity

Christopher Cerf has been entertaining children for a long time. He founded the nonbroadcast division of Sesame Street in 1970, and has written music and lyrics for the television show. Since the introduction of microcomputers, he has been developing ways of educating and entertaining kids with them; Cerf and Jim Henson of Muppet fame created the video game version of *The Dark Crystal* for Sierra On-Line.



Joseph Weizenbaum, author of Computer Power and Human Reason.

Cerf also developed the original concept of Sesame Place, parks near Dallas and Philadelphia which house computer centers where children can learn to use micros.

And he doesn't believe that kids are being deeply affected by the violence in video games. "I'm certainly not pro-violence," Cerf says. "I don't want to put it in games that I work on. But I think people greatly overestimate the horrible dangers of video games. Unless a child is greatly disturbed in some other way, I don't think he's going to go out and kill someone after playing a game of *Space Invaders*.

"I'm not denying that we don't all have some sort of aggressive instinct. Look at the way dogs will have mock fights — not really hurt each other, but just play. If the violence in a game is silly, it's just as good to play.

"Any medium that comes along has a reaction like this. Look at how horrified parents used to be that their children were wasting their quarters in movie theaters. And in the fifties, it was comic books. Doing anything in excess is a problem. You need to try to see it in perspective."

Cerf believes that resorting to extreme violence in a video game indicates a lack of creativity on the programmer's part. "I was appalled by the violence in *Death Race 2000*. In the last year or two, program-

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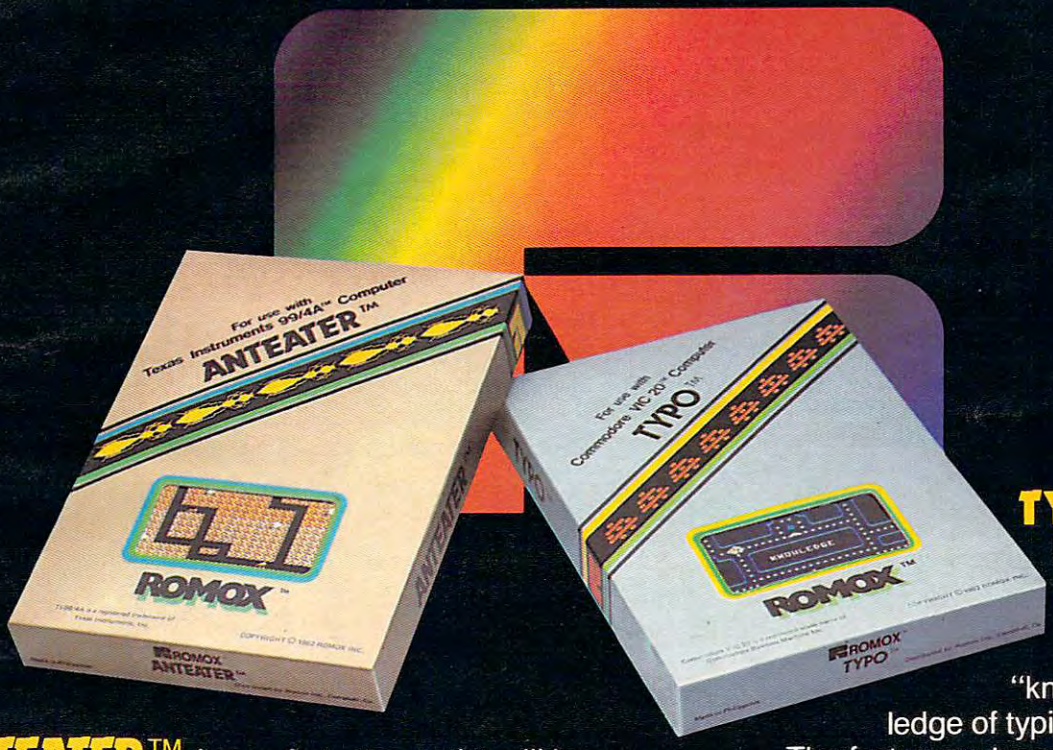

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mers have been designing games that are less violent and more creative. *Pac-Man* and *Frogger* are good examples. So are the new interactive fiction games."

"Software companies need to be innovative about the uses of computers for women. And that means producing something that appeals to what women traditionally have valued and needed. Not violence."

Mary Rowe, assistant to the president, M.I.T.

A Generation Of Loners?

Violence aside, some people argue that video games promote antisocial behavior. Maybe *Galaxia* won't make you want to shoot everything in sight, but how is a child or young adult going to learn how to interact with other people if he or she spends a great deal of time in an arcade or the house playing games on the home computer?

Christopher Cerf believes that computers foster, rather than hinder, communication. "Computers as a medium are one of the most exciting," he says. "They use elements of many other media.

"In schools, kids get excited about computing. They stay after school and compare notes and try to work out programming problems. And services like CompuServe and The Source also tend to bring people together. Kids who spend a lot of time alone with their computers or in arcades would probably be doing something else alone anyway.

"What's really interesting about this whole computer business is that, for the first time, the kids generally know more than the adults. My father was in publishing and he read everything — except science fiction. I loved science fiction and could recommend books to him. In that way, I think computers tend to bring families together."

Nothing For Women

There is little question that men are generally more interested in video games than women are at this point. *Pac-Man* was a breakthrough game in that sense; lots of women liked it, perhaps because of its apparent lack of violence.

Still, women are not leaping into the computer age with the same fervor as men seem to be. Mary Rowe, Assistant to the President at M.I.T., thinks that this is due to a lack of sensitivity on the part of many software producers. And to the fact that there is a lot of violence and sexism in video games.

"As a feminist, I'm concerned about the male slant of these things," Rowe says. "Why have computer companies made so few attempts to produce games that are not violent and sexist?

"Software companies need to be innovative about the uses of computers for women. And that means producing something that appeals to what women traditionally have valued and needed. Not violence."

Rowe does believe that some software companies are taking risks and developing programs that meet these needs. "I became computer-literate on Infocom's games. We need more games like that that require the player to actually think, not just hit the fire button at the right time."

Subtle Software

Nonviolent games fare very well on lists of best-selling software these days. Brøderbund's successful *Choplifter* is a good example. It's not an absolutely nonviolent game — there are terrorists and enemy tanks and guns going off. But the player does not get points for destroying things, only for rescuing people from the terrorists.

However, software companies which are producing nonviolent games are not necessarily trying

Christopher Cerf is currently working on a nonviolent video game, Pigs In Space.

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to counteract any backlash against video games. Pat Marriot, of Electronic Arts, believes that people's opposition to video games is "an emotional thing. Parents wondering if their kids should be hanging out in arcades. *Donkey Kong* and *Pac-Man* are not really violent. It's just the environment of a video arcade that is disturbing.

"We look for quality and uniqueness in our programs," says Marriot. "We're not reacting against anything, we're going for quality. We look for authors whose values are consistent with those of the company. Each of our designers has a story to tell, and that story becomes the product.

"We don't really consciously try to make our games nonviolent, but because of our authors' basic philosophies, they usually do not involve violence," says Marriot. She points to *Hardhat Mack* as an example: "The character is very appealing. There's lots of humor in it. It seems to appeal to younger girls and to people who don't necessarily like games."

The Adventure Alternative

A video game doesn't have to have blasting guns and anguished screams to be violent. Even the pacifist Pac-Man has his own sublimated violence. He's a cute, nonthreatening little guy, but there are four potential killers on his trail. To avoid being destroyed, he must turn around and try to destroy them first.

It may be impossible to create a video game that does not incorporate some amount of violence, however unobtrusive it may be. Games involve competition. Even if you're just playing against yourself, you're always trying to overcome someone or something.

But in some games, you can actually benefit by resisting the urge to commit a violent act. In the text adventure *Witness*, by Infocom, you play a detective trying to solve a murder case. While you're trying to find the murderer, you have ample opportunity to rough up some of the suspects if you like. The game was designed to anticipate a variety of responses, even violent ones.

A violent response, though, is counterproductive, says Marc Blank, Vice-President of Product Development at Infocom. If a player reacts that way, the result is not good, and may lead to someone else getting killed.

Yet the designers at Infocom did not set out to produce games with pacifistic messages. "I don't think violence plays any part in our choices," says Blank. "We're not making a conscious effort to be nonviolent. We're just trying to produce programs of more literary quality."

This may be a contributing factor to Infocom's popularity with women, a market that software producers are sometimes finding difficult to please. "There is very little software for young women," says Blank. "Women generally read more than men, so our adventures are more appealing to them."

Better Technology?

Maybe the arcade is the monster, not the video game. According to an article in *Newsweek* (August 8, 1983), video games peaked with an average weekly earning of $140 per machine in 1981, but last year it was down to $109. Is this because people are playing games at home on their personal computers and don't need arcades anymore? Or is it a result of the backlash against video games?

It may be neither. *Dragon's Lair*, an arcade game recently released by Bluth Animation, has people lined up around the block in some cities, waiting for their turn to play. *Newsweek* says single machines featuring this game are taking in up to $1400 per week. Even at 50 cents a crack, that's about a 500% increase over the current average earnings of arcade games.

Dragon's Lair is anything but nonviolent. Its hero, Dirk the Daring, must battle countless foes in 38 different scenes in order to rescue the game's heroine, Daphne.

But what's attracting people to it is a new technology that combines the use of laser disks and computers. Unlike other arcade games, this one projects a movie-quality image. It's like stepping into a cartoon and controlling the characters yourself.

Dragon's Lair, *a popular new arcade game, combines laser disk technology and computers to create a movie-like image.* ©

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How To Type COMPUTE!'s Programs

Many of the programs which are listed in **COMPUTE!** contain special control characters (cursor control, color keys, inverse video, etc.). To make it easy to tell exactly what to type when entering one of these programs into your computer, we have established the following listing conventions. There is a separate key for each computer. Refer to the appropriate tables when you come across an unusual symbol in a program listing. If you are unsure how to actually enter a control character, consult your computer's manuals.

Atari 400/800

Characters in inverse video will appear like: INVERSE VIDEO
Enter these characters with the Atari logo key, {*}.

When you see	Type	See	
{CLEAR}	ESC SHIFT <		Clear Screen
{UP}	ESC CTRL -		Cursor Up
{DOWN}	ESC CTRL =		Cursor Down
{LEFT}	ESC CTRL +		Cursor Left
{RIGHT}	ESC CTRL *		Cursor Right
{BACK S}	ESC DELETE		Backspace
{DELETE}	ESC CTRL DELETE		Delete character
{INSERT}	ESC CTRL INSERT		Insert character
{DEL LINE}	ESC SHIFT DELETE		Delete line
{INS LINE}	ESC SHIFT INSERT		Insert line
{TAB}	ESC TAB		TAB key
{CLR TAB}	ESC CTRL TAB		Clear tab
{SET TAB}	ESC SHIFT TAB		Set tab stop
{BELL}	ESC CTRL 2		Ring buzzer
{ESC}	ESC ESC		ESCape key

Graphics characters, such as CTRL-T, the ball character ● will appear as the "normal" letter enclosed in braces, e.g. {T}.

A series of identical control characters, such as 10 spaces, three cursor-lefts, or 20 CTRL-R's, will appear as {10 SPACES}, {3 LEFT}, {20 R}, etc. If the character in braces is in inverse video, that character or characters should be entered with the Atari logo key. For example, {■} means to enter a reverse-field heart with CTRL-comma, {5■} means to enter five inverse-video CTRL-U's.

Commodore PET/CBM/VIC/64

Generally, any PET/CBM/VIC/64 program listings will contain words within braces which spell out any special characters: {DOWN} would mean to press the cursor down key. {5 SPACES} would mean to press the space bar five times.

To indicate that a key should be *shifted* (hold down the SHIFT key while pressing the other key), the key would be underlined in our listings. For example, S would mean to type the S key while holding the shift key. If you find an underlined key enclosed in braces (e.g., {10 N}), you should type the key as many times as indicated (in our example, you would enter ten shifted N's). Some graphics characters are inaccessible from the keyboard on CBM Business models (32N, 8032).

For the VIC and 64, if a key is enclosed in special brackets, [< >], you should hold down the *Commodore key* while pressing the key inside the special brackets. (The Commodore key is the key in the lower left corner of the keyboard.) Again, if the key is preceded by a number, you should press the key as many times as indicated.

Rarely, you'll see in a Commodore 64 program a solitary letter of the alphabet enclosed in braces. These characters can be entered by holding down the CTRL key while typing the letter in the braces. For example, {A} would indicate that you should press CTRL-A.

About the *quote mode*: you know that you can move the cursor around the screen with the CRSR keys. Sometimes a programmer will want to move the cursor under program control. That's why you see all the {LEFT}'s, {HOME}'s, and {BLU}'s in our programs. The only way the computer can tell the difference between direct and programmed cursor control is the quote mode.

Once you press the quote (the double quote, SHIFT-2), you are in the quote mode. If you type something and then try to change it by moving the cursor left, you'll only get a bunch of reverse-video lines. These are the symbols for cursor left. The only editing key that isn't programmable is the DEL key; you can still use DEL to back up and edit the line. Once you type another quote, you are out of quote mode.

You also go into quote mode when you INSerT spaces into a line. In any case, the easiest way to get out of quote mode is to just press RETURN. You'll then be out of quote mode and you can cursor up to the mistyped line and fix it.

Use the following tables when entering special characters:

When You Read:	Press:	See:	When You Read:	Press:	See:
{BLK}	CTRL 1		[5]	C= 5	
{WHT}	CTRL 2		[6]	C= 6	
{RED}	CTRL 3		[7]	C= 7	
{CYN}	CTRL 4		[8]	C= 8	
{PUR}	CTRL 5		{F1}	f1	
{GRN}	CTRL 6		{F2}	f2	
{BLU}	CTRL 7		{F3}	f3	
{YEL}	CTRL 8		{F4}	f4	
[1]	C= 1		{F5}	f5	
[2]	C= 2		{F6}	f6	
[3]	C= 3		{F7}	f7	
[4]	C= 4		{F8}	f8	

All Commodore Machines

Clear Screen	{CLR}	Cursor Left	{LEFT}
Home Cursor	{HOME}	Insert Character	{INST}
Cursor Up	{UP}	Delete Character	{DEL}
Cursor Down	{DOWN}	Reverse Field On	{RVS}
Cursor Right	{RIGHT}	Reverse Field Off	{OFF}

Apple II / Apple II Plus

All programs are in Applesoft BASIC, unless otherwise stated. Control characters are printed as the "normal" character enclosed in brackets, such as {D} for CTRL-D. Hold down CTRL while pressing the control key. You will not see the special character on the screen.

Texas Instruments 99/4

The only special characters used are in PRINT statements to indicate where two or more spaces should be left between words. For example, ENERGY {10 SPACES} MANAGEMENT means that ten spaces should be left between the words ENERGY and MANAGEMENT. Do not type in the braces or the words 10 SPACES. Enter all programs with the ALPHA LOCK on (in the down position). Release the ALPHA LOCK to enter lowercase text.

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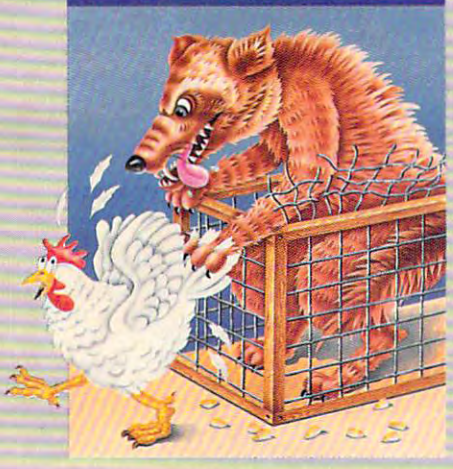
HYPER-HEN



An arcade-style, maze configured game, HYPER-HEN challenges even the most proficient joystick jockeys. Five levels of fast-paced play assure that your adrenalin level stays at its peak while starving coyotes, dive-bombing chicken-hawks, and deadly ZOMPIES attack from every side.

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With your Commodore '64 computer plotting the precise coordinates for this dangerous mission, prepare for the most engaging video battle of your life. Three separate and highly detailed scenarios mean 48K of memory is required to present CARGO RUN, the most sophisticated game now available for the Commodore '64.

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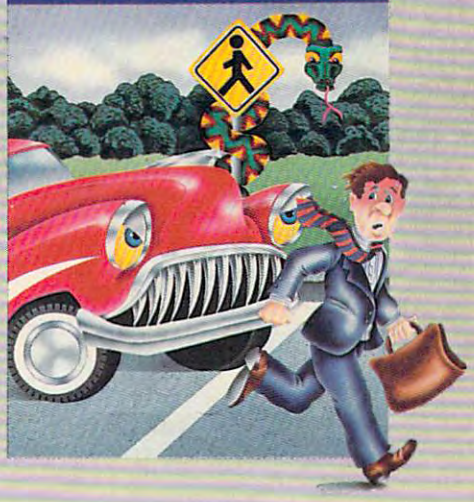
PEDESTRIAN



Keep your eyes wide open and your wits about you. As the PEDESTRIAN you'll have to cross the rush-hour freeway and race through the park full of muggers and monsters. If you're lucky you'll be able to keep your balance while jumping from log to log across the river to your home.

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COUPON FILE

Ken D. McCann and Dale McBane,
Technical Assistant

Not only will this program create easily accessible files for disk or tape storage, but also it will run on any Commodore machine, Atari, TI, Apple, and Color Computer. And with minor adjustments, you can file nearly anything.

This program allows you to file and search for coupons. Coupons may be located by brand name, product, or expiration date, and you may scan the contents of all the files. "Coupon File" could also help you file a great variety of things.

The use of DATA statements as file structures is one of the things that makes this program so versatile. Because the DATA statements are saved with the program, file retrieval is not a problem, even if you don't have disk capability.

The DATA statements were placed before the main program loop to simplify file insertions and deletions. Because the file number and line number for the DATA statements are the same, those of you unfamiliar with programming will find it easy to create files.

Using The Program On Your Computer

There is room for 499 files, assuming you have enough memory to store 499 files. Because of the search routine, each file must have the same format. This is especially true with the date search. 6/30/83, 6-30-83, and 30JUN83 are all different representations of the same date, but for the computer to locate that date, you must choose one format and be consistent.

Coupon File was written to run on any machine which supports BASIC, with one exception. Lines 501, 1000, 1550, 2000, 4000, 6000, and 7100 consist of the statement PRINT "{CLR}". This is COMPUTE!'s listing convention for clear screen on the Commodore 64 and VIC-20. You should substitute the statement to clear the screen on your particular machine (ESC SHIFT < for Atari, CALL CLEAR for TI, etc.).

To make more room for files, you can leave out the instructions. To do this, delete lines 550-555, 630, and 6000-7000, and change line 590 to:

```
590 IF (K$<>"L")*(K$<>"B")*(K$<>"P")*(K$<>"D")*
    (K$<>"C") THEN GOTO 570
```

This versatile program is very easy to use, and it's easy to adapt for other purposes. With a few changes, you can create a program to file nearly anything.

Special Note To Timex/Sinclair Users:

Because your machine's version of BASIC does not contain READ or DATA statements, this program will not run on your machine. You may be able to adapt it to your machine using strings for file storage.

Program Explanation

Lines

1-499	DATA
500-650	main menu
1000-1700	list all routine
2000-3600	brand search routine
4000-5700	date search routine
6000-7000	instructions
7100-8610	product search routine
9000-9600	display routine
10000-10300	file input routine

Coupon File

```
1 DATA 1,OXYDOL,DETERGENT,FREE,NONE
2 DATA 2,PLANTERS,MIXED NUTS,25C,31MAR84
3 DATA 3,FREE N' SOFT,FABRIC SOFTNER,20C,
  1JAN84
4 DATA 4,JELLO,PUDDING,15C,15MAY84
5 DATA 5,JENOS,PIZZA,1$ R,4JUL84
6 DATA 6,CHINET,PLATES,20C,21DEC83
7 DATA 7,PEPPIS,PIZZA,60C,15MAY84
8 DATA 8,CHINET,CUPS,20C,20JUL83
9 DATA 9,NABISCO,SHREDDED WHEAT,20C,30JUN
  84
10 DATA 10,HEFTY,TRASH BAGS,25C,31OCT83
11 DATA 11,WHEATSWORTH,CRACKERS,12C,30JUN
   84
12 DATA 12,KRAFT,JELLY,10C,NONE
```


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```
13 DATA 13,PHILADELPHIA,CREAM CHEESE,10C,
   NONE
14 DATA 14,PREGO,SPAGETTI SAUCE,20C,30JUN
   84
500 DATA END
501 PRINT "{CLR}":REM CLEAR SCREEN
502 PRINT "COUPON FILE"
503 PRINT
504 LET T=0
520 PRINT "<L>{2 SPACES}LIST ALL ENTRIES"
525 PRINT
530 PRINT "<B>{2 SPACES}BRAND NAME "
533 PRINT
535 PRINT "<P>{2 SPACES}PRODUCT"
537 PRINT
540 PRINT "<D>{2 SPACES}EXPIRATION DATE"
545 PRINT
550 PRINT "<H>{2 SPACES}INSTRUCTIONS"
555 PRINT
560 PRINT "<C>{2 SPACES}COMMAND MODE"
565 PRINT
570 PRINT "CHOICE ";
580 INPUT K$
590 IF (K$<>"L")*(K$<>"B")*(K$<>"P")*(K$<
    >"D")*(K$<>"H")*(K$<>"C")THEN GOTO 57
    0
600 IF K$="L" THEN GOSUB 1000
610 IF K$="B" THEN GOSUB 2000
615 IF K$="P" THEN GOSUB 7100
620 IF K$="D" THEN GOSUB 4000
630 IF K$="H" THEN GOSUB 6000
640 IF K$="C" THEN END
650 GOTO 501
1000 PRINT "{CLR}":REM CLEAR SCREEN
1010 PRINT "COUPON LIST"
1015 PRINT
1100 GOSUB 10000
1200 IF A$="END" THEN RETURN
1550 PRINT "{CLR}":REM CLEAR SCREEN
1600 GOSUB 9000
1700 GOTO 1000
2000 PRINT "{CLR}":REM CLEAR SCREEN
2200 PRINT "ENTER BRAND"
2300 INPUT J$
2400 PRINT
2410 PRINT "BRAND: ";J$
2420 PRINT
2430 PRINT
2500 GOSUB 10000
2600 IF A$="END" THEN GOTO 3300
3000 IF B$<>J$ THEN GOTO 2500
3100 GOSUB 9000
3150 LET T=1
3200 GOTO 2500
3300 IF T=1 THEN GOTO 3600
3350 PRINT J$;" NOT ON FILE"
3360 PRINT
3400 PRINT "HIT RETURN TO CONTINUE"
3450 PRINT
3500 INPUT K$
3600 RETURN
4000 PRINT "{CLR}":REM CLEAR SCREEN
4200 PRINT "ENTER EXPIRATION DATE"
4300 INPUT J$
4400 PRINT
4410 PRINT "DATE: ";J$
4420 PRINT
4430 PRINT
4500 GOSUB 10000
4600 IF A$="END" THEN GOTO 5300
5000 IF E$<>J$ THEN GOTO 4500
5100 GOSUB 9000
5150 LET T=1
5200 GOTO 4500
5300 IF T=1 THEN GOTO 5600
5350 PRINT "NONE EXPIRE ";J$
5360 PRINT
5400 PRINT "HIT RETURN TO CONTINUE"
5410 PRINT
5500 INPUT K$
5600 RESTORE
5700 RETURN
6000 PRINT "{CLR}":REM CLEAR SCREEN
6200 PRINT "TO ENTER A FILE, PLACE"
6350 PRINT "THE COMPUTER IN COM-"
6400 PRINT "MAND MODE (THE MODE"
6450 PRINT "BEFORE YOU TYPE RUN)."
6500 PRINT "TYPE IN THE LINE NUM-"
6550 PRINT "BER,' DATA ',THE FILE"
6600 PRINT "NUMBER, THE BRAND NAME"
6650 PRINT "THE PRODUCT, THE VALUE"
6700 PRINT "AND EXPIRATION DATE."
6710 PRINT
6720 PRINT
6800 PRINT "HIT RETURN TO CONTINUE"
6900 INPUT K$
7000 RETURN
7100 PRINT "{CLR}":REM CLEAR SCREEN
7200 PRINT "ENTER PRODUCT"
7300 INPUT J$
7400 PRINT
7410 PRINT "PRODUCT: ";J$
7420 PRINT
7430 PRINT
7500 GOSUB 10000
7600 IF A$="END" THEN GOTO 8300
8000 IF C$<>J$ THEN GOTO 7500
8100 GOSUB 9000
8150 LET T=1
8200 GOTO 7500
8300 IF T=1 THEN GOTO 8600
8350 PRINT J$;" NOT ON FILE"
8360 PRINT
8400 PRINT "HIT RETURN TO CONTINUE"
8410 PRINT
8500 INPUT K$
8600 RESTORE
8610 RETURN
9000 PRINT "FILE NUMBER>";A$
9010 PRINT
9100 PRINT "BRAND{6 SPACES}>";B$
9110 PRINT
9150 PRINT "PRODUCT{4 SPACES}>";C$
9160 PRINT
9200 PRINT "VALUE{6 SPACES}>";D$
9210 PRINT
9300 PRINT "EXP. DATE{2 SPACES}>";E$
9310 PRINT
9400 PRINT
9410 PRINT "HIT X TO ABORT TO MENU"
9420 PRINT "HIT RETURN TO CONTINUE"
9500 INPUT K$
9540 IF K$="X" THEN RESTORE
9550 IF K$="X" THEN GOTO 501
9600 RETURN
10000 READ A$
10100 IF A$="END" THEN RESTORE
10110 IF A$="END" THEN RETURN
10200 READ B$,C$,D$,E$
10300 RETURN
```

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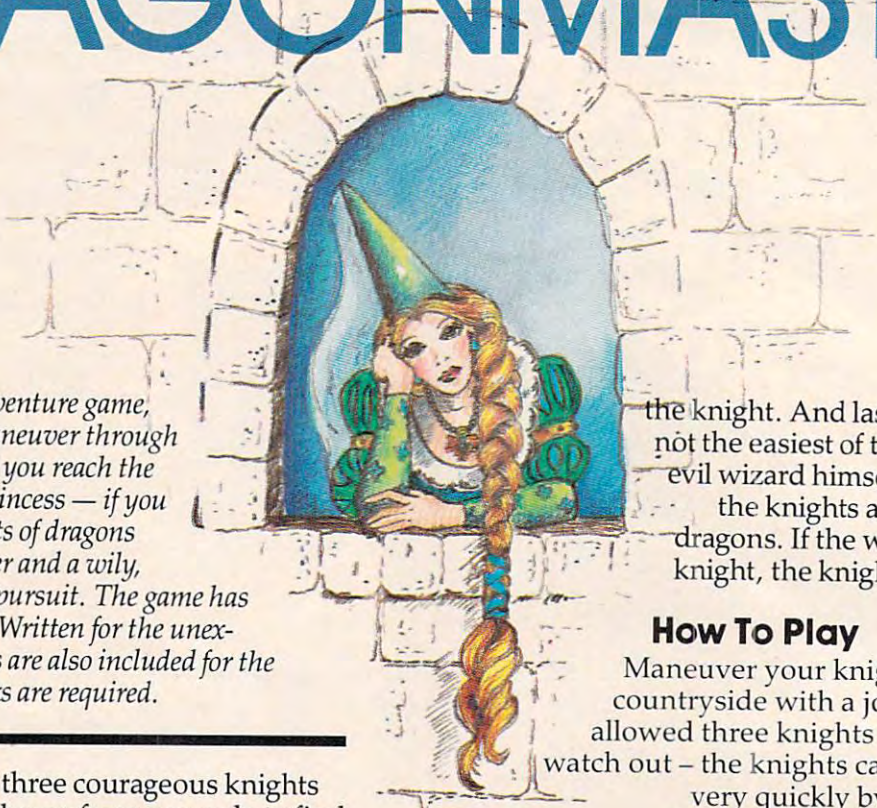
DRAGONMASTER

David Berdan



In this fast-action adventure game, your mission is to maneuver through the countryside until you reach the castle and save the princess — if you can. There are all sorts of dragons you must first conquer and a wily, evil wizard in steady pursuit. The game has four difficulty levels. Written for the unexpanded VIC, versions are also included for the 64 and Atari. Joysticks are required.

This game involves three courageous knights who have returned home from war only to find that the countryside surrounding their castle is infested with dragons that were placed there by an evil wizard. Trapped inside the castle is the beautiful princess, who anxiously awaits the first knight who can rescue her. One at a time the knights try to slay all the dragons and enter the castle to save the princess.

The knights quickly discover the many dangers of the hunt. A dragon will eat anyone who comes near its head. The only way to get rid of one is to zap it in the stomach. Guarding the castle is a phantom dragon that can only be eliminated when all the others have been overcome. (The castle drawbridge will remain closed until he is conquered.) At times a dragon will appear from nowhere, and occasionally a dragon you thought you'd disposed of will reappear to have another try at the knight. And last, but certainly not the easiest of the perils, is the evil wizard himself, who chases the knights as they hunt the dragons. If the wizard catches a knight, the knight is destroyed.

How To Play

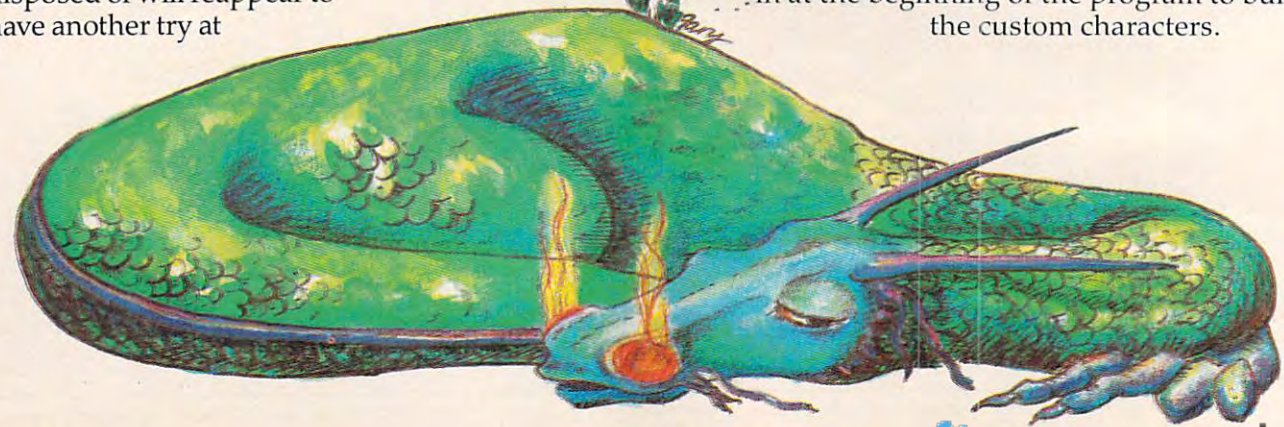
Maneuver your knight through the countryside with a joystick. You are allowed three knights at the start, but watch out – the knights can be consumed very quickly by a dragon.

When you encounter a dragon, you must act quickly. Using your fire button, aim at the dragon's stomach. This is its only vulnerable point.

You have no defense against the evil wizard except speed. You must be constantly aware of his distance from you. Remember – if he catches you, your knight is destroyed.

VIC Dragonmaster

The original VIC version of "Dragonmaster" utilizes a programmable character set. Since 232 numerical values were needed to create the 29 characters used in the game, it was necessary to create a data file containing the numbers and read them in at the beginning of the program to build the custom characters.



Janice Fary

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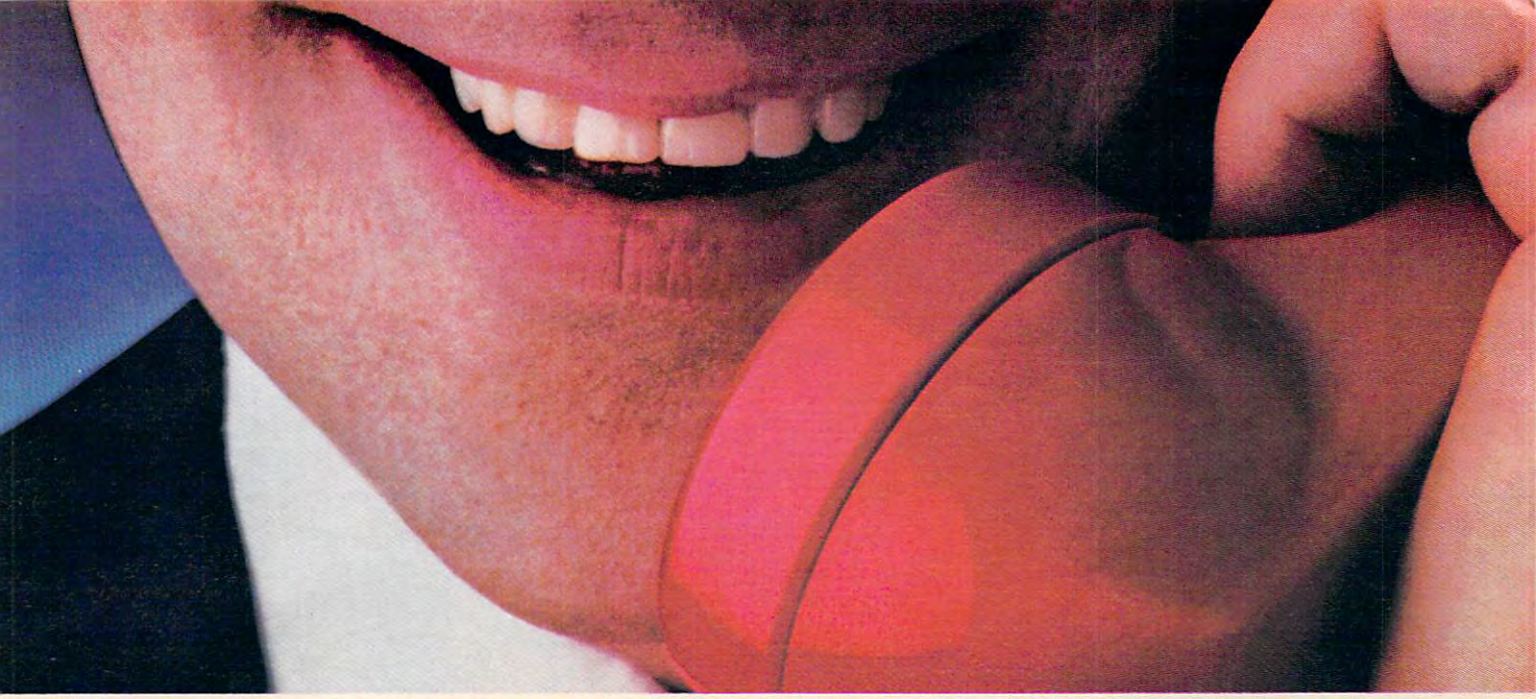

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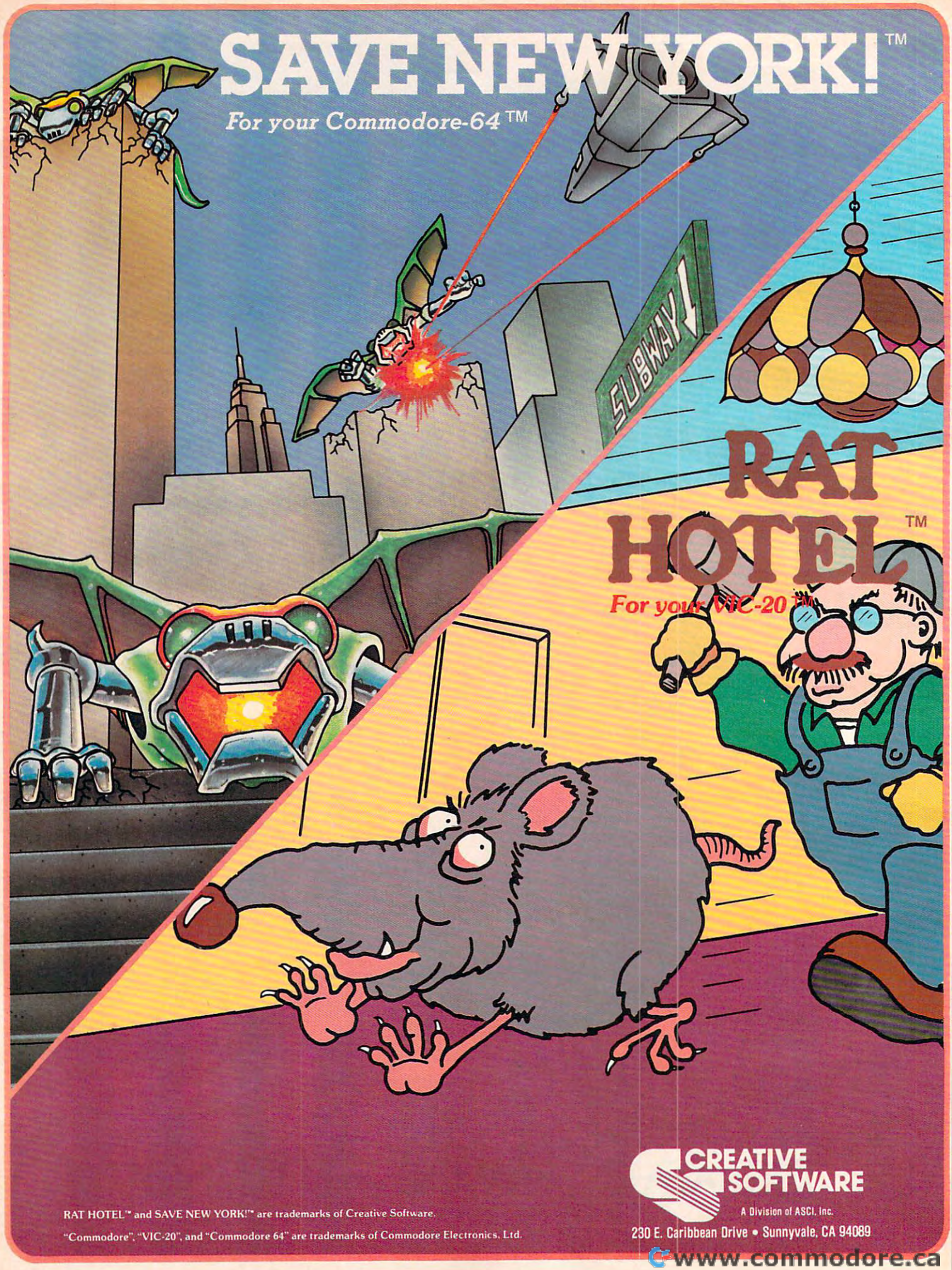

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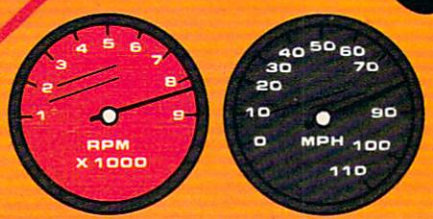

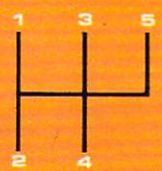

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Program 1 is the main game program. Program 2 is the data file needed to establish the character set used in the game. (Please note that due to the need to protect a block of memory for the character set, the VIC version will run only on the unexpanded VIC. Please remove any RAM expansion cartridges.)

Carefully type in Program 1, check it for accuracy, and SAVE it on tape. If you try to RUN Program 1 at this time, it will want to input the data from the data file which has not yet been made. Next, type NEW and then type in Program 2. Be careful while typing in the numbers here, as any slip up will result in ill-formed characters. When you are certain that everything is right, RUN Program 2. Your VIC will ask you to press Record and Play before it starts writing the data on the tape immediately following the copy of Program 1. After a minute or so the screen will display DATATAPE CREATED and the tape will stop. It would be wise to save a copy of Program 2 a little farther down on the tape so that if you need it again you won't have to retype all those numbers.

Rewind the tape to the beginning of Program 1 and type LOAD. When the program has been read in, type RUN.

Difficulty Levels

The first thing to appear on the screen is the instructions. You are asked to choose any of four skill levels by pressing the appropriate function key. The degree of difficulty is determined by how fast the wizard pursues the knight. The EASY level (F1) presents a real challenge to the newcomer. You can expect to be defeated quite often while you are learning the finer points of the game. The next levels, HARD (F3) and VERY HARD (F5), are progressively difficult. The IMPOSSIBLE level (F7) is only for the expert. You must be exceptionally alert and skillful with the joystick to get into the castle at this level.

If you'd rather not type in this program, I'll make copies (VIC version only). Just send a blank cassette, self-addressed stamped mailer, and $3 to:

David Berdan
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BEFORE TYPING...

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Program 1: Dragonmaster – Main Program (unexpanded VIC)

```
100 PRINT"{CLR}":IFPEEK(7448)=60ANDPEEK(7
    679)=160THEN125
105 PRINT"DATA BEING READ IN"
110 OPEN1,1,0,"DATATAPE"
115 FORD=7448TO7679:INPUT#1,A:POKED,A:NEX
    T
120 CLOSE1:POKE56,29
125 CLR:PRINT"{CLR}{BLK}":U=36878:DR=15:K
    =2:JS=37154:P=7712:SW=0:S1=U-2:GOSUB2
    00:GOSUB280
130 ZZ=7912:POKEZZ,35
135 POKEJS,127:V=PEEK(JS-2)AND128
140 E=-(V=0):POKEJS-2,255:V=PEEK(JS-3)
145 S=-((VAND8)=0):W=-((VAND16)=0):N=-((V
    AND4)=0):SW=-((VAND32)=0):Q=P
150 IFSANDPEEK(P+22)=32THENP=P+22
155 IFWANDPEEK(P-1)=32THENP=P-1
160 IFNANDPEEK(P-22)=32THENP=P-22
165 IFEANDPEEK(P+1)=32THENP=P+1
170 POKEP+30720,0
175 GOSUB420:IFQ<>PTHENPOKEQ,32:POKEP,53
180 IFSWTHENGOSUB375
185 IFPEEK(P+1)=37ORPEEK(P+1)=60ORPEEK(P-
    1)=42THENGOSUB330
190 IFPEEK(P+22)=37ORPEEK(P+22)=60ORPEEK(
    P+22)=42THENGOSUB330
195 GOSUB470:GOTO135
200 PRINT"{DOWN}{5 SPACES}DRAGONMASTER"
205 PRINT"{DOWN}OBJECT: BLAST ALL":PRINT"
    {RIGHT}DRAGONS AND ENTER{5 RIGHT}CAST
    LE TO MARRY
210 PRINT"PRINCESS.
215 PRINT"{DOWN}ZAP DRAGONS FROM THE
    {2 SPACES}FRONT WITH FIRE BUTTON
220 PRINT"{DOWN}MUST DEFEAT PHANTOM":PRIN
    T"DRAGON LAST
225 PRINT:PRINT"PRESS: F1-EASY":PRINTTAB(
    7)"F3-HARD"
230 PRINTTAB(7)"F5-VERY HARD":PRINTTAB(7)
    "F7-IMPOSSIBLE"
235 SL=15:GETA$:IFA$=""THEN235
240 IFA$<CHR$(134)ORA$>CHR$(136)THENPRINT
    "{CLR}":RETURN
245 IFA$=CHR$(134)THENSL=10:PRINT"{CLR}":
    RETURN
250 IFA$=CHR$(135)THENSL=6:PRINT"{CLR}":R
    ETURN
255 SL=3:PRINT"{CLR}":RETURN
260 CL=INT(RND(1)*2)*2
265 CS=L+30720:POKECS,CL:POKECS+1,CL:POKE
    CS+22,CL:POKECS+23,CL
270 POKEL,M:POKEL+1,M+1:POKEL+22,M+2:POKE
    L+23,M+3:RETURN
275 POKEL,32:POKEL+1,32:POKEL+22,32:POKEL
    +23,32:RETURN
280 FORI=1TO126:PRINT"{4 SPACES}";:NEXT:P
    RINT" {HOME}":POKE38905,0
285 POKEU+1,30:FORC=7424TO7431:POKEC,0:NE
    XT:POKEU-9,255
290 L=7888:M=45:CL=7:GOSUB265:POKE38629,C
    L:POKE7909,49:CL=4:L=L-3:M=60:GOSUB26
    5:F=36
295 FORX=7680TO7701:POKEX,F:NEXT:FORX=770
    2TO8142STEP22:POKEX,F:POKEX+21,F:NEXT
300 FORX=8164TO8185:POKEX,F:NEXT:FORX=1TO
    15:Z=INT(RND(1)*2)
305 READA:M=41:L=7726+A:IFZTHENM=37
310 GOSUB260:NEXT:POKEU,15:POKE7712,53:PO
    KE7693,53:POKE7694,53
315 DATA 1,15,31,69,101,111,199,206,212,2
    68,275,316,353,362,367
320 FORX=49TO52:POKE7909,X:POKES1,(X-44)*
    28:FORT=1TO1000:NEXT:NEXT:GOSUB325:RE
    TURN
```


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```
325 POKEU,0:POKES1,0:RETURN
330 POKEU,15:FORF=1TO2:FORX=130TO200:POKE
    S1,X:NEXT
335 FORX=200TO130STEP-1:POKES1,X:NEXT:POK
    EP,F+53:NEXT:GOSUB325
340 POKE7695-K,36:K=K-1:IFK=-1THEN455
345 POKEP,32:P=7712:POKEP,53:RETURN
350 L=P-21:M=56:CL=0:GOSUB265:GOSUB400:L=
    P-21:GOSUB275:POKEU,15
355 FORX=52TO49STEP-1:POKE7909,X:POKES1,(
    X-44)*28:FORT=1TO1000:NEXT:NEXT:GOSUB
    325
360 FORX=7907TO7909:POKEX-1,32:POKEX+3072
    0,0:POKEX,53:FORT=1TO1000:NEXT:NEXT:P
    OKEX,32
365 POKEU+1,59:POKEU-9,240:PRINT"{CLR}":P
    OKE214,22:PRINT:PRINT"{4 RIGHT}AND TH
    EY LIVED"
370 PRINT"{DOWN}{2 RIGHT}HAPPILY EVER AFT
    ER":GOTO460
375 CL=0:X=PEEK(P+1):Y=PEEK(P-1):IFX=62AN
    DDR=0THEN350
380 IFX<>39ANDY<>44THENRETURN
385 IFX=39THENL=P-21:M=56:GOSUB265
390 IFY=44THENL=P-24:M=56:GOSUB265
395 DR=DR-1
400 POKEU,15:FORX=250TO128STEP-1:POKES1,X
    :NEXT:GOSUB325
405 IFPEEK(P+1)=58THENL=P-21:GOSUB275
410 IFPEEK(P-1)=59THENL=P-24:GOSUB275
415 RETURN
420 H=INT(RND(1)*414)+7726:BB=INT(RND(1)*
    2):X=PEEK(H)
425 IFX=37THENL=H:M=41:GOSUB260:RETURN
430 IFX=41THENL=H:M=37:GOSUB260:RETURN
435 IFH<>7731ANDH<>7822ANDH<>7874ANDH<>80
    05ANDH<>8106THENRETURN
440 IFX<>32ORPEEK(H+1)<>32ORPEEK(H+22)<>3
    2ORPEEK(H+23)<>32THENRETURN
445 IFBB=1THENL=H:M=37:DR=DR+1:GOSUB265:R
    ETURN
450 L=H:M=41:DR=DR+1:GOSUB265:RETURN
455 POKEU-9,240:POKEU+1,59:PRINT"{CLR}":P
    OKE214,22:PRINT:PRINT"{3 RIGHT}THE DR
    AGONS WIN"
460 FORX=1TO23:PRINT:FORT=1TO150:NEXT:NEX
    T
465 POKEU+1,27:GOTO125
470 CW=(CW+1)AND7:IFCW=1THENCW=2
475 POKEZZ+30720,CW:CC=CC+1:IFCC=SLTHEN48
    5
480 RETURN
485 IZ=INT((ZZ-7680)/22):IP=INT((P-7680)/
    22):NZ=INT((IZ+IP)/2)*22
490 NZ=NZ+(P-IP*22+ZZ-IZ*22)/2:CC=1
495 IFPEEK(NZ)=32THENPOKEZZ,32:POKENZ,35:
    GOTO510
500 IFPEEK(NZ)=53THENGOSUB330
505 RETURN
510 ZZ=NZ:IFPEEK(ZZ+1)=53ORPEEK(ZZ-1)=53O
    RPEEK(ZZ+22)=53ORPEEK(ZZ-22)=53THENGO
    SUB330
515 RETURN
```

Program 2: Dragonmaster – Data File (for VIC)

```
1 OPEN1,1,2,"DATATAPE"
2 READX:PRINT#1,X:IFX=-1THEN4
3 GOTO2
4 CLOSE1:PRINT"DATATAPE CREATED"
5 END
10 DATA60,66,165,129,153,165,66,60,170,85
   ,170,85,170,85,170,85,0,56,108,254,15
20 DATA15,31,31,0,0,0,0,1,6,12,152,255,63
   ,63,31,31,15,31,61,176,176,152,216,220
30 DATA252,248,224,0,0,0,0,128,96,48,25,0
   ,28,54,127,240,240,248,248,13,13,25,27
40 DATA59,63,31,7,255,252,252,248,248,240
   ,248,188,0,0,84,124,108,56,56,189
50 DATA21,31,27,31,14,14,14,94,255,255,25
   5,255,170,255,255,0,254,254,254,254,17
   0
60 DATA254,254,0,0,0,0,0,0,0,255,0,0,0,0,
   32,24,6,1,0,0,0,16,8,4,2,1,0,0,8
70 DATA4,4,2,2,1,0,24,126,90,219,24,36,66
   ,195,0,24,60,90,24,36,0,0,0,0,0,0
80 DATA24,24,0,0,0,16,0,2,72,2,21,75,21,1
   30,16,64,162,72,160,90,224,7,42
90 DATA133,18,5,32,4,0,168,210,168,64,18,
   64,8,32,0,40,68,82,5,10,21,10,0,0,0,0
100 DATA1,2,4,16,85,42,21,10,21,10,21,40,
    128,144,0,144,72,164,80,160,-1
```

A dragon turns to dust in "Dragonmaster," VIC version.

Program 3: Dragonmaster – 64 Version

Translation by Chris Metcalf, Programming Assistant

```
1000 PRINT"{CLR}{7}":POKE53280,14:POKE5
     3281,6
1010 IFPEEK(14846)=80ANDPEEK(14847)=160TH
     EN1070
1020 PRINTTAB(14)"{8 DOWN}PLEASE WAIT":PR
     INTTAB(11)"DATA BEING READ IN"
1030 FORI=1TO24:READA:NEXT
1040 FORD=14616TO14847:READA:POKED,A:NEXT
     :POKE52,57:POKE56,57
1050 :
1060 :
1070 REM RESTART PROGRAM
1080 CLR:PRINT"{CLR}{7}":DR=24:K=2:P=10
     84:S1=54276:S2=54283:GOSUB1260:GOSUB
     1490
1090 POKES2-1,3:POKES2+1,8:POKES2+2,0
1100 ZZ=1446:POKEZZ,35:GR(0)=1:GR(1)=12:G
     R(2)=11:GR(3)=0:GR(4)=11:GR(5)=12
1110 :
1120 V=31-PEEK(56320)AND31:Q=P
1130 IFVAND2ANDPEEK(P+40)=32THENP=P+40
1140 IFVAND4ANDPEEK(P-1)=32THENP=P-1
1150 IFVAND1ANDPEEK(P-40)=32THENP=P-40
1160 IFVAND8ANDPEEK(P+1)=32THENP=P+1
```


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```
1170 POKES2,8:POKEP+54272,GR(GR):GR=GR+1:
     IFGR=6THENGR=0
1180 GOSUB1930:IFQ<>PTHENPOKEQ,32:POKEP,5
     3:POKES2,65:POKES2-3,3
1190 IFVAND16THENGOSUB1800
1200 IFPEEK(P+1)=37ORPEEK(P+1)=60ORPEEK(P
     -1)=42THENGOSUB1640
1210 IFPEEK(P+40)=37ORPEEK(P+40)=60ORPEEK
     (P+40)=42THENGOSUB1640
1220 GOSUB2090:GOTO1120
1230 :
1240 :
1250 REM INSTRUCTIONS AND SKILL LEVEL
1260 PRINTTAB(8)"*** 64 DRAGONMASTER ***"
1270 PRINT"{2 DOWN} OBJECT: BLAST ALL DRA
     GONS AND ENTER"
1280 PRINT"{2 SPACES}THE CASTLE TO MARRY
     {SPACE}THE PRINCESS."
1290 PRINT"{2 DOWN} ZAP THE DRAGONS FROM
     {SPACE}THE FRONT WITH"
1300 PRINT "{2 SPACES}THE FIRE BUTTON, BU
     T STAY AWAY":PRINT"{2 SPACES}FROM TH
     EIR HEADS!"
1310 PRINT"{2 DOWN} YOU MUST ELIMINATE PH
     ANTOM DRAGON LAST"
1320 PRINT"{2 DOWN}{2 SPACES}PRESS: F1 --
      EASY":PRINTTAB(9)"{DOWN}F3 -- STAND
     ARD"
1330 PRINTTAB(9)"{DOWN}F5 -- VERY HARD":P
     RINTTAB(9)"{DOWN}F7 -- EXTREMELY HAR
     D"
1340 SL=15:GETA$:IFA$=""THEN1340
1350 IFA$<CHR$(134)ORA$>CHR$(136)THENPRIN
     T"{CLR}":RETURN
1360 IFA$="{F3}"THENSL=10:PRINT"{CLR}":RE
     TURN
1370 IFA$="{F5}"THENSL=6:PRINT"{CLR}":RET
     URN
1380 SL=3:PRINT"{CLR}":RETURN
1390 :
1400 :
1410 REM DRAW AND ERASE DRAGONS, ETC.
1420 CL=INT(RND(1)*2)*2
1430 CS=L+54272:POKECS,CL:POKECS+1,CL:POK
     ECS+40,CL:POKECS+41,CL
1440 POKEL,M:POKEL+1,M+1:POKEL+40,M+2:POK
     EL+41,M+3:RETURN
1450 POKEL,32:POKEL+1,32:POKEL+40,32:POKE
     L+41,32:RETURN
1460 :
1470 :
1480 REM INITIALIZE PLAYFIELD, DRAGONS
1490 POKE53265,0:POKE53280,6
1500 POKE53281,0:PRINT"{CLR}":POKE53281,1
     5:FORC=14592TO14599:POKEC,0:NEXT:CL=
     11
1510 L=1404:M=45:GOSUB1430:POKE1443,49:L=
     L-3:M=60:GOSUB1430:F=36
1520 FORX=1024TO1063:POKEX,F:NEXT:FORX=10
     64TO1944STEP40:POKEX,F:POKEX+39,F:NE
     XT
1530 FORX=1984TO2023:POKEX,F:NEXT:FORX=1T
     O24:Z=INT(RND(1)*2)
1540 READA:M=41:L=1106+A:IFZTHENM=37
1550 GOSUB1420:NEXT:POKE53272,31:POKE1084
     ,53:POKE1047,53:POKE1048,53
1560 DATA 1,30,65,82,91,138,203,222,234,3
     01,329,345,401,412,424,456,536
1570 DATA 550,567,632,690,706,724,734
1580 POKE54296,15:POKE54277,138:POKE54278
     ,0:POKE53265,27
1590 FORX=49TO52:POKE1443,X:POKE54273,(X-
```

Dragonmaster For The 64 And Atari

Chris Metcalf, Programming Assistant

The Commodore 64 version of "Dragonmaster" runs much the same as the VIC version. However, the colors are somewhat different. You will find that you are a flashing figure in shades of gray, a feature which could not be implemented on the VIC due to the memory shortage. The pursuing wizard flashes all the colors of the rainbow (magic!) and, by his mystic powers, pursues you by always halving the distance between you. If at any point his leap brings him to within one square of you, you're finished.

The dragons are the main obstacle in your chivalrous adventure. To eliminate a dragon, you have to move directly in front of his stomach and press the fire button. The dragon will disappear. The phantom dragon guarding the gates must be dispatched last. You will find that the dragons do move about and change color now and then, but this is only restlessness. In addition, a dragon will occasionally appear from nowhere to test your mettle.

The programming techniques involved in this version, as in the VIC version, are fairly straightforward. Programmable characters are used for dragons, castle, walls, knights, wizard, etc. The data for these characters is stored from 14336 to 16384, although the program uses only a part of this. The characters are put on the screen by POKEs, as are their colors (the color screen on the 64 is from 55296 to 56295). Simple sounds are created using two voices of the SID chip. Voice one controls dragon and the knights elimination as well as drawbridge noises; voice two maintains the movement noise.

The Atari version also employs programmable characters (the same data, in fact), located in the block of 512 bytes below the top of your available memory. The colors used are somewhat different. The castle and outside walls, the dragons, the wizard, and the knight each use different color registers. Graphics mode 1 is used to simulate the VIC's 22-column display as closely as possible. The sound used is simple Atari sound. However, the program is basically the same as the VIC version in terms of play.

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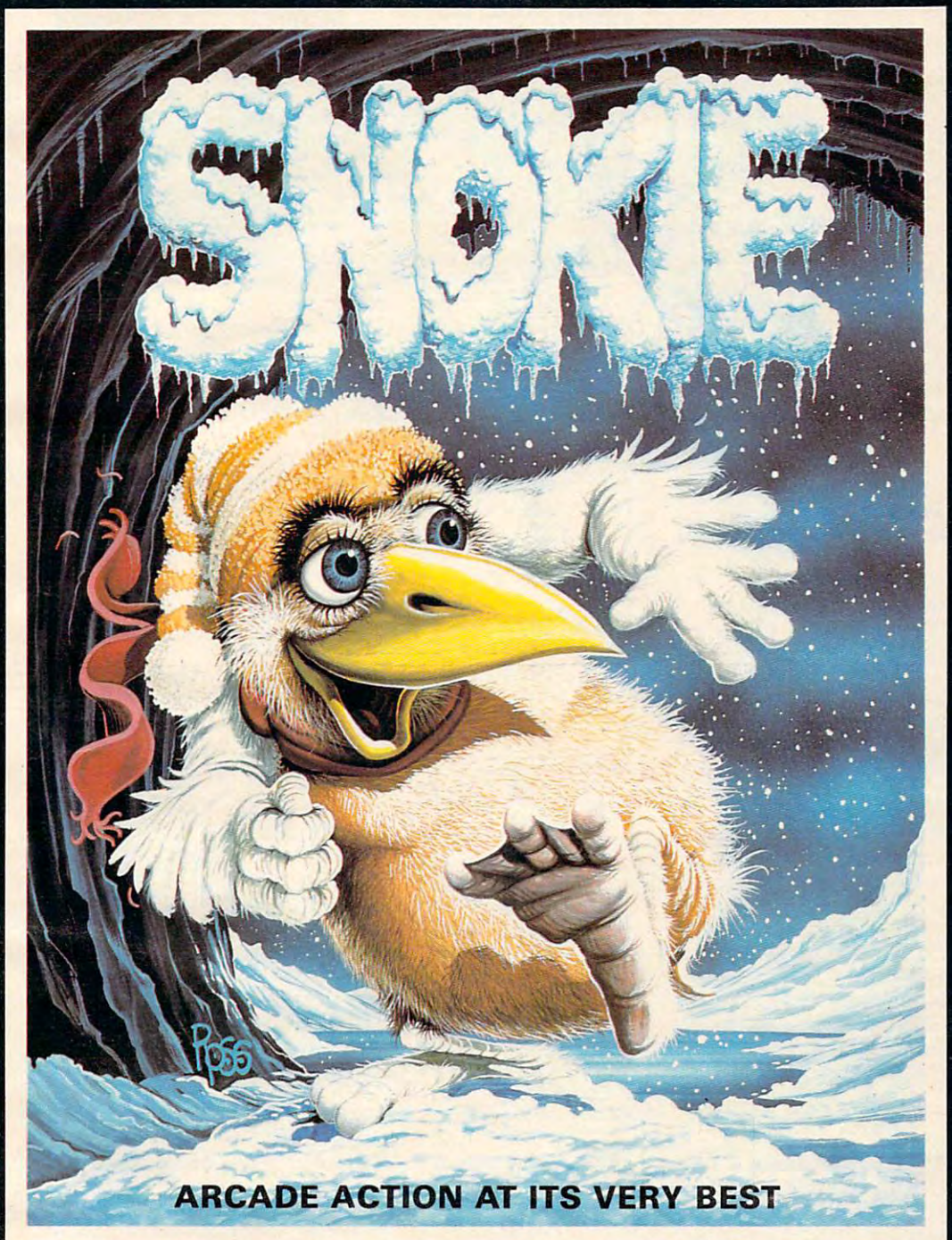
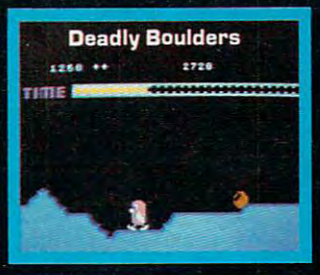
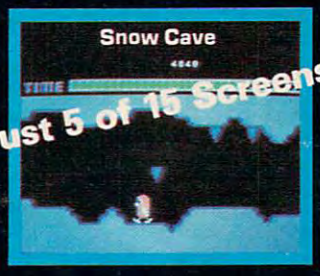
Run! Jump! Duck! Slide HIDE Flee!

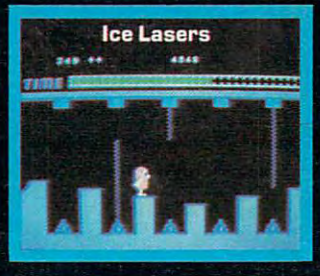
You Won't Just Sit There . . . .







Just 5 of 15 Screens



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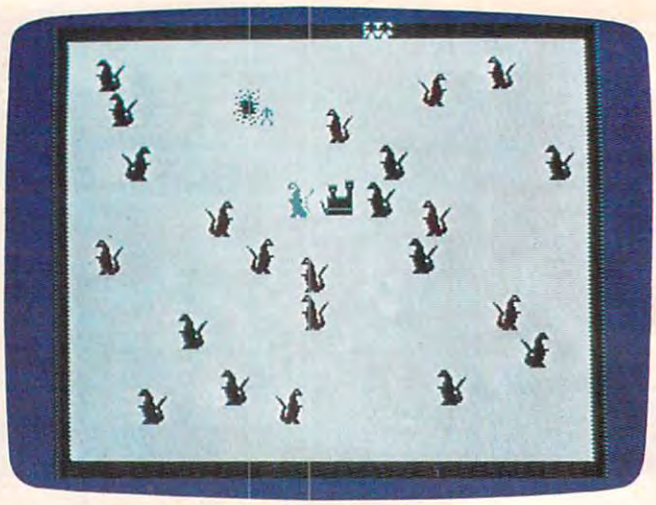
```
     48)*10:POKES1,8:POKES1,17
1600 FORT=1TO800:NEXT:NEXT:GOSUB1680:RETU
     RN
1610 :
1620 :
1630 REM PHANTOM DRAGON DIES, VICTORY
1640 FORF=1TO2:POKES1,8:POKES1,33:FORX=0T
     O40STEP.8:POKE54273,X:NEXT
1650 POKES1,8:POKES1,33:FORX=40TO0STEP-.8
     :POKE54273,X:NEXT
1660 POKEP,F+53:NEXT:POKES1,8
1670 POKE1049-K,36:K=K-1:IFK<0THEN2030
1680 POKEP,32:P=1084:POKEP,53:RETURN
1690 L=P-39:CL=1:M=56:GOSUB1430:GOSUB1860
     :L=P-39:GOSUB1450:POKE53272,31
1700 POKE54277,138:POKE54278,0
1710 FORX=52TO49STEP-1:POKE1443,X:POKES1,
     8:POKES1,33:POKE54273,(X-48)*10
1720 FORT=1TO800:NEXT:NEXT:POKES1,8
1730 FORX=1441TO1443:POKEX-1,32:POKEX+542
     72,1:POKEX,53:FORT=1TO800:NEXT:NEXT
1740 PRINT"{CLR}":POKE53280,7:POKE53281,7
1750 POKE53272,21:PRINT"{CLR}{23}"TAB(13
     )"{22 DOWN}AND THEY LIVED"
1760 PRINTTAB(11)"{DOWN}HAPPILY EVER AFTE
     R":GOTO2050
1770 :
1780 :
1790 REM ELIMINATE A DRAGON
1800 CL=0:X=PEEK(P+1):Y=PEEK(P-1):IFX=62A
     NDDR=0THEN1690
1810 IFX<>39ANDY<>44THENRETURN
1820 IFX=39THENL=P-39:M=56:GOSUB1430
1830 IFY=44THENL=P-42:M=56:GOSUB1430
1840 DR=DR-1
1850 :
1860 POKES1,8:POKES1,129:FORX=20TO0STEP-.
     25:POKE54273,X:NEXT:POKES1,8
1870 IFPEEK(P+1)=58THENL=P-39:GOSUB1450
1880 IFPEEK(P-1)=59THENL=P-42:GOSUB1450
1890 RETURN
1900 :
1910 :
1920 REM TURN DRAGON / CREATE A NEW ONE
1930 H=INT(RND(1)*835)+1106:L=H:BB=INT(RN
     D(1)*2):X=PEEK(H)
1940 IFX=37THENM=41:GOSUB1420:RETURN
1950 IFX=41THENM=37:GOSUB1420:RETURN
1960 IFRND(1)>.033THENRETURN
1970 FORI=-80TO120STEP40:FORJ=-2TO3:IFPEE
     K(H+I+J)<>32THENRETURN
1980 NEXT:NEXT:M=41:DR=DR+1:IFBB=1THENM=3
     7
1990 GOSUB1420:RETURN
2000 :
2010 :
2020 REM THE DRAGONS HAVE WON
2030 PRINT"{CLR}":POKE53280,2:POKE53281,2
2040 POKE53272,21:PRINT"{CLR}{23}"TAB(13
     )"{24 DOWN}THE DRAGONS WIN"
2050 FORX=1TO23:PRINT:FORT=1TO150:NEXT:NE
     XT:POKE53280,14:POKE53281,6:GOTO1080
2060 :
2070 :
2080 REM THE EVIL WIZARD MOVES
2090 CW=(CW+1)AND15:IFCW=15THENCW=0
2100 CC=CC+1:POKEZZ+54272,CW:IFCC<>SLTHEN
     RETURN
2110 IZ=INT((ZZ-1024)/40):IP=INT((P-1024)
     /40):NZ=INT((IZ+IP)/2)*40
2120 NZ=NZ+(P-IP*40+ZZ-IZ*40)/2:CC=1
2130 IFPEEK(NZ)<>32THENRETURN
```



A knight zaps a dragon in "Dragonmaster," 64 version.

```
2140 POKEZZ,32:POKENZ,35:ZZ=NZ:POKEZZ+542
     72,CW
2150 ZZ=NZ:IFPEEK(ZZ+1)=53ORPEEK(ZZ-1)=53
     ORPEEK(ZZ+40)=53THENGOSUB1640
2160 IFZZ>1103ANDPEEK(ZZ-40)=53THENGOSUB1
     640
2170 RETURN
2180 :
2190 :
2200 DATA60,66,165,129,153,165,66,60,170,
     85,170,85,170,85,170,85
2210 DATA0,56,108,254,15,15,31,31,0,0,0,0
     ,1,6,12,152
2220 DATA255,63,63,31,31,15,31,61,176,176
     ,152,216,220,252,248,224
2230 DATA0,0,0,0,128,96,48,25,0,28,54,127
     ,240,240,248,248
2240 DATA13,13,25,27,59,63,31,7,255,252,2
     52,248,248,240,248,188
2250 DATA0,0,84,124,108,56,56,189,21,31,2
     7,31,14,14,14,94
2260 DATA255,255,255,255,170,255,255,0,25
     4,254,254,254,170,254,254,0
2270 DATA0,0,0,0,0,0,255,0,0,0,0,32,24,6,
     1,0
2280 DATA0,0,16,8,4,2,1,0,0,8,4,4,2,2,1,0
2290 DATA24,126,90,219,24,36,66,195,0,24,
     60,90,24,36,0,0
2300 DATA0,0,0,24,24,0,0,0,16,0,2,72,2,21
     ,75,21
2310 DATA130,16,64,162,72,160,90,224,7,42
     ,133,18,5,32,4,0
2320 DATA168,210,168,64,18,64,8,32,0,40,6
     8,82,5,10,21,10
2330 DATA0,0,0,0,1,2,4,16,85,42,21,10,21,
     10,21,40
2340 DATA128,144,0,144,72,164,80,160
```

Program 4: Dragonmaster – Atari Version

Translation by Chris Metcalf, Programming Assistant

```
1000 GOSUB 2270:POKE 77,0:POKE 752,1
     :SC=PEEK(88)+PEEK(89)*256
1010 CH=PEEK(742)*256-1024
1020 IF PEEK(CH+24)=60 AND PEEK(CH+2
     55)=160 THEN 1060
1030 POSITION 4,9:PRINT #6;"PLEASE W
     AIT":PRINT #6:PRINT #6;" DATA B
     EING READ IN"
```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"Dragonmaster," Atari version.

```
1040 FOR I=1 TO 15:READ A:NEXT I:FOR
     D=CH+24 TO CH+255:READ A:POKE
     D,A:NEXT D
1050 REM
1060 REM RESTART PROGRAM
1070 RESTORE :DR=15:K=2:P=SC+30:GR=0
     :CW=0
1080 GOSUB 1240:GOSUB 1450
1090 ZZ=SC+212:POKE ZZ,35+192
1100 REM
1110 V=15-STICK(0):Q=P:V=V/2
1120 IF V<>INT(V) AND PEEK(P-20)=0 T
     HEN P=P-20
1130 V=INT(V)/2:IF V<>INT(V) AND PEE
     K(P+20)=0 THEN P=P+20
1140 V=INT(V)/2:IF V<>INT(V) AND PEE
     K(P-1)=0 THEN P=P-1
1150 V=INT(V)/2:IF V<>0 AND PEEK(P+1
     )=0 THEN P=P+1
1160 IF Q<>P THEN POKE Q,0:POKE P,53
     +128:SOUND 1,100,6,15
1170 GOSUB 1880:SOUND 1,0,0,0
1180 IF STRIG(0)=0 THEN GOSUB 1760
1190 IF PEEK(P+1)=37 OR PEEK(P+1)=60
     +64 OR PEEK(P-1)=42 THEN GOSUB
     1590
1200 IF PEEK(P+20)=37 OR PEEK(P+20)=
     60+64 OR PEEK(P+20)=42 THEN GOS
     UB 1590
1210 GOSUB 2020:GOTO 1110
1220 REM
1230 REM INSTRUCTIONS AND SKILL LEVE
     L
1240 GOSUB 2270:POSITION 4,1:PRINT #
     6;"dragonmaster":PRINT #6:PRINT
      #6
1250 PRINT #6;"  OBJECT: BLAST ALL":
     PRINT #6;" DRAGONS AND ENTER"
1260 PRINT #6;" CASTLE TO RESCUE":PR
     INT #6;" PRINCESS.":PRINT #6:PR
     INT #6
1270 PRINT #6;"  ZAP DRAGONS FROM":P
     RINT #6;" FRONT WITH BUTTON.":P
     RINT #6:PRINT #6
1280 PRINT #6;"  ELIMINATE PHANTOM":
     PRINT #6;" DRAGON LAST."
1290 PRINT #6:PRINT #6
1300 PRINT #6;"{3 SPACES}1 = easy.":P
     RINT #6;"{3 SPACES}2 = standard
     "
1310 PRINT #6;"{3 SPACES}3 = very ha
     rd":PRINT #6;"{3 SPACES}4 = imp
     ossible":SL=15:GR=0
1320 A=PEEK(764):IF PEEK(764)=255 TH
     EN GR=GR+0.4:GR=GR-(GR>=256)*25
     6+(INT(GR)=198):POKE 711,INT(GR
     ):GOTO 1320
1330 POKE 764,255:GOSUB 2270:POKE 75
     6,CH/256:IF A=30 THEN SL=10:RET
     URN
1340 IF A=26 THEN SL=6:RETURN
1350 IF A=24 THEN SL=3:RETURN
1360 RETURN
1370 REM
1380 REM DRAW AND ERASE DRAGONS, ETC
     .
1390 CL=0
1400 COL=CL*64
1410 POKE L,M+COL:POKE L+1,M+1+COL:P
     OKE L+20,M+2+COL:POKE L+21,M+3+
     COL:RETURN
1420 POKE L,0:POKE L+1,0:POKE L+20,0
     :POKE L+21,0:RETURN
1430 REM
1440 REM INITIALIZE PLAYFIELD DRAGON
     S
1450 GOSUB 2270:POKE 756,CH/256
1460 FOR C=CH TO CH+7:POKE C,0:NEXT
     C:CL=1
1470 L=SC+190:M=45:GOSUB 1400:POKE S
     C+209,49+64:L=L-3:M=60:GOSUB 14
     00:F=36+128
1480 FOR X=SC TO SC+19:POKE X,F:NEXT
      X:FOR X=SC TO SC+460 STEP 20:P
     OKE X,F:POKE X+19,F:NEXT X
1490 FOR X=SC+460 TO SC+479:POKE X,F
     :NEXT X:FOR X=1 TO 15:Z=INT(RND
     (1)*2)
1500 READ A:M=41:L=SC+42+A:IF Z THEN
      M=37
1510 GOSUB 1390:NEXT X:POKE 756,CH/2
     56:POKE SC+30,53+128:POKE SC+13
     ,53+128:POKE SC+14,53+128
1520 DATA 1,14,31,69,101,111,200,206
     ,212,268,274,314,353,362,367
1530 FOR X=49 TO 52:POKE SC+209,X+64
1540 FOR T=1 TO 75:SOUND 0,(54-X)*40
     ,10,15-T/5:NEXT T:NEXT X
1550 GOSUB 1630
1560 RETURN
1570 REM
1580 REM WE DIE AND ARE (?) REBORN
1590 FOR F=1 TO 2:FOR X=150 TO 80 ST
     EP -1:SOUND 0,X,10,15:NEXT X
1600 FOR X=80 TO 150:SOUND 0,X,10,15
     :NEXT X:SOUND 0,0,0,0
1610 POKE P,F+53+128:NEXT F
1620 POKE SC+15-K,36+128:K=K-1:IF K<
     0 THEN 1970
1630 POKE P,0:P=SC+30:POKE P,53+128:
     RETURN
1640 REM
1650 REM PHANTOM DRAGON DIES; VICTOR
     Y
1660 L=P-19:CL=0:M=56:GOSUB 1400
1670 GOSUB 1820:L=P-19:GOSUB 1420
1680 FOR X=52 TO 49 STEP -1:POKE SC+
     209,X+64:FOR T=1 TO 75
1690 SOUND 0,(54-X)*40,10,15-T/5:NEX
     T T:NEXT X
```


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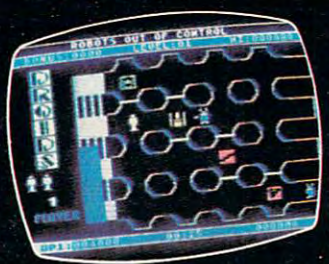

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(Atari Version)
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One or two players
16K Required

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```
1700 FOR X=SC+207 TO SC+209:POKE X-1
     ,0:POKE X,53+128:FOR T=1 TO 75:
     NEXT T:NEXT X
1710 GRAPHICS 0:SETCOLOR 4,2,6:SETCO
     LOR 2,2,6:SETCOLOR 1,1,2
1720 POKE 756,224:POSITION 13,23:PRI
     NT "AND THEY LIVED"
1730 PRINT :PRINT "{9 SPACES}HAPPILY
      EVER AFTER":GOTO 1990
1740 REM
1750 REM ELIMINATE A DRAGON
1760 CL=0:X=PEEK(P+1):Y=PEEK(P-1):IF
      X=62+64 AND DR=0 THEN 1660
1770 IF X<>39 AND Y<>44 THEN RETURN
1780 IF X=39 THEN L=P-19:M=56:GOSUB
     1400
1790 IF Y=44 THEN L=P-22:M=56:GOSUB
     1400
1800 DR=DR-1
1810 REM
1820 FOR X=200 TO 255:SOUND 0,X,10,1
     5:NEXT X:SOUND 0,0,0,0
1830 IF PEEK(P+1)=58 THEN L=P-19:GOS
     UB 1420
1840 IF PEEK(P-1)=59 THEN L=P-22:GOS
     UB 1420
1850 RETURN
1860 REM
1870 REM TURN DRAGON, CREATE NEW ONE
1880 H=INT(RND(1)*396)+SC+42:L=H:BB=
     INT(RND(1)*2):X=PEEK(H)
1890 IF X=37 THEN M=41:GOSUB 1390:RE
     TURN
1900 IF X=41 THEN M=37:GOSUB 1390:RE
     TURN
1910 IF RND(1)>0.033 THEN RETURN
1920 FOR I=-40 TO 60 STEP 20:FOR J=-
     2 TO 3:IF PEEK(H+I+J) THEN RETU
     RN
1930 NEXT J:NEXT I:M=41:DR=DR+1:IF B
     B=1 THEN M=37
1940 GOSUB 1390:RETURN
1950 REM
1960 REM THE DRAGONS HAVE WON
1970 GRAPHICS 0:SETCOLOR 4,4,4:SETCO
     LOR 2,4,4:SETCOLOR 1,4,8
1980 POKE 756,224:POSITION 13,23:PRI
     NT "THE DRAGONS WIN"
1990 POKE 752,1:FOR X=1 TO 23:PRINT
     :FOR T=1 TO 35:NEXT T:NEXT X:GO
     TO 1060
2000 REM
2010 REM THE EVIL WIZARD MOVES
2020 CW=CW+7:IF CW>255 THEN CW=CW-25
     6
2030 POKE 711,CW:CC=CC+1:IF CC<>SL T
     HEN RETURN
2040 IZ=INT((ZZ-SC)/20):IP=INT((P-SC
     )/20):NZ=INT((IZ+IP)/2)*20
2050 NZ=NZ+(P-IP*20+ZZ-IZ*20)/2:CC=1
     :IF PEEK(NZ)=53+128 THEN GOSUB
     1590
2060 IF PEEK(NZ) THEN RETURN
2070 POKE ZZ,0:POKE NZ,35+192:ZZ=NZ
2080 IF PEEK(ZZ+1)=53+128 OR PEEK(ZZ
     +20)=53+128 OR PEEK(ZZ-1)=53+12
     8 THEN GOSUB 1590
2090 IF ZZ>SC+39 AND PEEK(ZZ-20)=53+
     128 THEN GOSUB 1590
2100 RETURN
2110 REM CHARACTER DATA
2120 DATA 60,66,165,129,153,165,66,6
     0,170,85,170,85,170,85,170,85
2130 DATA 0,56,108,254,15,15,31,31,0
     ,0,0,0,1,6,12,152
2140 DATA 255,63,63,31,31,15,31,61,1
     76,176,152,216,220,252,248,224
2150 DATA 0,0,0,0,128,96,48,25,0,28,
     54,127,240,240,248,248
2160 DATA 13,13,25,27,59,63,31,7,255
     ,252,252,248,248,240,248,188
2170 DATA 0,0,84,124,108,56,56,189,2
     1,31,27,31,14,14,14,94
2180 DATA 255,255,255,255,170,255,25
     5,0,254,254,254,254,170,254,254
     ,0
2190 DATA 0,0,0,0,0,0,255,0,0,0,0,32
     ,24,6,1,0
2200 DATA 0,0,16,8,4,2,1,0,0,8,4,4,2
     ,2,1,0
2210 DATA 24,126,90,219,24,36,66,195
     ,0,24,60,90,24,36,0,0
2220 DATA 0,0,0,24,24,0,0,0,16,0,2,7
     2,2,21,75,21
2230 DATA 130,16,64,162,72,160,90,22
     4,7,42,133,18,5,32,4,0
2240 DATA 168,210,168,64,18,64,8,32,
     0,40,68,82,5,10,21,10
2250 DATA 0,0,0,0,1,2,4,16,85,42,21,
     10,21,10,21,40
2260 DATA 128,144,0,144,72,164,80,16
     0
2270 GRAPHICS 17:SETCOLOR 4,12,6:SET
     COLOR 0,0,0:SETCOLOR 1,0,10:SET
     COLOR 2,4,2:RETURN
```

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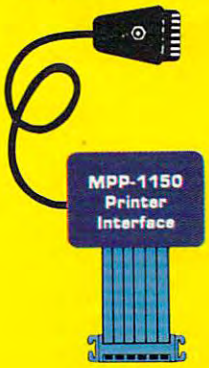

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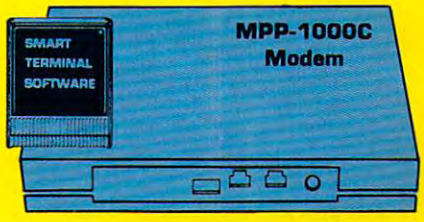

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Moving Maze

Matt Giwer

Can you maneuver through "Moving Maze" while fighting time and avoiding the relentless pursuit of the Rover? Impossible? Try it and see. Written for the Atari with joystick, versions are included for the unexpanded VIC (joystick optional) and the 64 with joystick.

During a stop for refueling on an out-of-the-way planet, you meet a mysterious old man who offers you the key to a fantastic treasure buried deep within a mountain. Many have tried to get to it, but all have been stopped by the unspeakable Rover of the Maze. The old man has the master control to a moving maze which guards the treasure. With his dying gasp he puts it in your hand. It looks like an antique Atari joystick. "Push the button," he says, "and you will control the maze." Never being one to pass up an adventure, you start off toward the mountain.

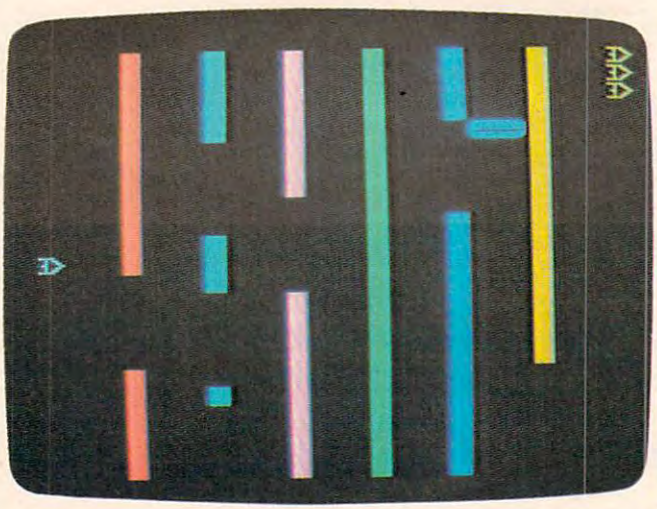
When you get there you find yourself on one side of a slowly moving maze. Every once in a while the dark red Rover passes your way. If you push the button on the joystick, the maze speeds up; if you release the button, the maze slows down. Armed with that secret you enter the maze. To get the treasure you must move as far as you can to the right side of the screen.

Game Movement

"Moving Maze" uses Player/Missile Graphics with string manipulation. The heart of the game is the technique in lines 2210 and 2217. This routine scrolls the dimensioned PM$ RAM that is devoted to Players 1, 2, and 3. In this game the vertical yellow lines that form the maze are these players. The speed is controlled by lines 2400 and 2410, where the scrolling is increased or decreased with each pass through the loop.

You move vertically and horizontally with a joystick. The difference in the two motions is that you can move horizontally only one increment at a time. This is controlled by setting and unsetting the flag (F1) in lines 2300, 2301, and 2305, and is necessary due to the speed with which the program executes and the lack of sensitivity of the Atari joystick. Without this flag, it is too easy to move two steps at once and crash into a wall.

Hitting a maze wall costs you one life and sends you back to the start. If the Rover runs over you, it costs you two lives (but sometimes you will be lucky and lose only one and not be sent back to the beginning). You have five lives to lose. Your final score will be 300 points, less one point per second it takes you to get through, plus 100 points for each life you have left when you finish. The maximum score is 800 points, but it is impossible to achieve. A good score is 750.



A ship is about to enter the maze in the VIC version of "Moving Maze."

Obstacles

The first difficulty is maneuvering through the walls of the maze, which are set up in the subroutine at the 5000 lines. Note that in line 55 the PM$ was not cleared to all blanks but was set to 146. This turned on bits 1, 4, and 7, which are those corresponding to 2, 16, and 128, respectively. Thus their sum, 146, is put into

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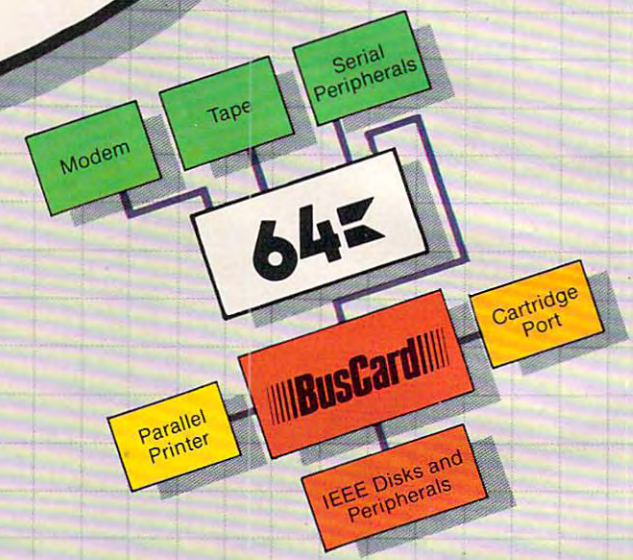

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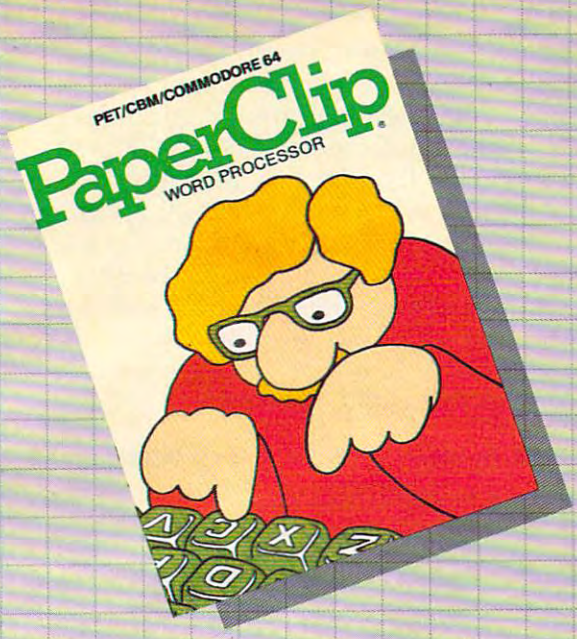

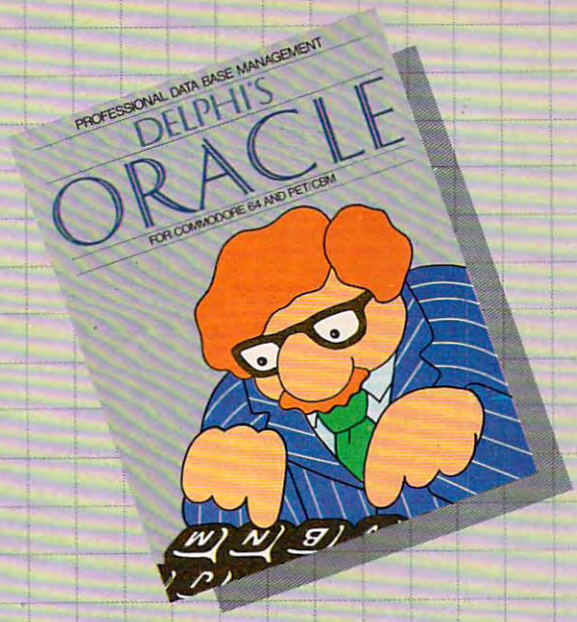

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all of the string characters. In lines 5000 through 5040 I set some of these lines to other combinations of 2, 16, and 128, specifically, 18, 130, and 144. This sets up a random series of openings in the lines. However, since this is random, there may never be an opening in some walls, so lines 5050, 5060, and 5070 create such openings. Line 5073 puts blanks into the Missile and Player 0 pages, and lines at 5080 read in the shapes for Player 0 and the Rover which are the combination of the four missiles. Player 0 has two shapes, the normal playing shape and the explosion shape.

The next difficulty is avoiding the Rover, who sweeps the corridors of the maze. Its movement is not totally random, however. In the routine at 5200, the range of the random variable for the Rover depends upon your location in the maze. If you are outside, all corridors are equally likely. However, the farther you get into the maze, the less "choice" the Rover has. When you are in the last corridor, the Rover roams only the last two corridors. Thus, the closer you get to exiting the maze, the more likely the Rover is to attack you in that corridor. Since the Rover (the computer) knows where you are, it can attack you more frequently when you are closest to winning. The Rover is not a typical adversary.

Colliding with the maze wall is handled in the 5100 lines. This routine writes in the explosion shape, provides an audio effect, decreases the lives, does some housekeeping, and then puts the player back to the beginning with the original shape. The 5400 lines handle being run over by the Rover.

Other Game Features

The routine at line 5700 handles the timing and scoring for the game. Line 5700 calculates the number of seconds since the internal clock in registers 18, 19, and 20 was reset. When the game first comes on, it has measured the time since the GRAPHICS 0 call in line 30018, which resets them automatically. These are reset within the game in line 5790. Register 20 is read first and reset last since it changes the fastest. This method also gives the most accurate time measurement.

Line 5710 determines the score, and the second statement in that line requires that you complete the maze to get any score at all. Therefore, winning requires completing the maze and moving your player to the right. The rest of the lines are resets for a new game.

Finally, the data for the player, the Rover, and the explosion are in lines 10000-10020.

The string manipulation technique in this game uses scrolling to good advantage. It permits the user to control the speed of the motion and to employ it in the game as an additional control variable. This adds complexity and requires more than a little getting used to in order to play the game well.

The technique also permits a very compact game. The program requires a bit over 5K and, when running, well under 10K. Further, I made no use of the unused 2K in PM$ but rather DIMensioned another array B$ for convenience. As to the power of this technique, it would be difficult to find another game using full P/M graphics in single-line resolution with as much motion and challenge that uses so little RAM. This is why I urge you to examine and master the technique.

Program 1: Moving Maze – Atari Version

```
50 DIM PM$(4096),B$(250)
55 PM$(1)=CHR$(146):PM$(4096)=CHR$(1
   46):PM$(2)=PM$(1)
56 B$(1)=CHR$(0):B$(250)=CHR$(0):B$(
   2)=B$(1)
90 SP=0
1900 GOSUB 30000:GOSUB 5000:GOSUB 52
     00:GOSUB 5800
2100 FOR IJK=0 TO 1 STEP 0
2120 IF S1=0 THEN GOSUB 5700
2210 PM$(ST-768,ST-768+SP)=PM$(ST+10
     24+255-SP,ST+1024+255):PM$(ST-7
     67+SP,ST-1)=PM$(ST+512,ST+1280-
     SP)
2217 PM$(ST+2*256+1+SP,ST+5*256)=PM$
     (ST-767+SP,ST-1):PM$(ST+512,ST+
     512+SP)=PM$(ST-768,ST-768+SP)
2300 T=STICK(0):IF T=15 THEN F1=0:GO
     TO 2350
2301 IF F1=1 THEN 2320
2305 F1=1:IF T>12 THEN 2320
2310 PX=PX+6*(T=7)-6*(T=11)+6*(PX<55
     )-6*(PX>199):POKE 53248,PX
2314 PX=PX+6*(T=7)-6*(T=11)+6*(PX<56
     )-6*(PX>200):POKE 53248,PX:GOTO
      2350
2320 PY=PY+10*(T=13)-10*(T=14)+10*(P
     Y<35)-10*(PY>225):PM$(ST+236+PY
     ,ST+283+PY)=B$(1,57)
2350 PMY=PMY+10:IF PMY>506 THEN GOSU
     B 5200
2360 PM$(ST+486-PMY,ST+513-PMY)=B$(5
     1,78)
2365 IF PEEK(53260)<>0 THEN GOSUB 51
     00
2370 IF PEEK(53258)<>0 THEN GOSUB 54
     00
2400 IF STRIG(0)=0 THEN SP=SP+1:IF S
     P>200 THEN SP=200
2410 IF STRIG(0)=1 THEN SP=SP-2:IF S
     P<0 THEN SP=0
2500 IF PX>180 THEN S1=0:WIN=1
2501 IF LIVES<=0 THEN S1=0
2900 NEXT IJK
4999 REM SET UP MAZE & PLAYER
5000 FOR I=ST+512 TO ST+5*256-1 STEP
      32
5010 T=INT(30*RND(0))+1:IF T>25 THEN
      IF T<28 THEN FOR J=0 TO 31:PM$
     (I+J,I+J)=CHR$(18):NEXT J
5020 IF T>27 THEN IF T<29 THEN FOR J
     =0 TO 31:PM$(I+J,I+J)=CHR$(130)
     :NEXT J
5030 IF T>28 THEN FOR J=0 TO 31:PM$(
     I+J,I+J)=CHR$(144):NEXT J
```


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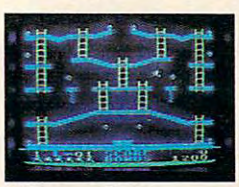

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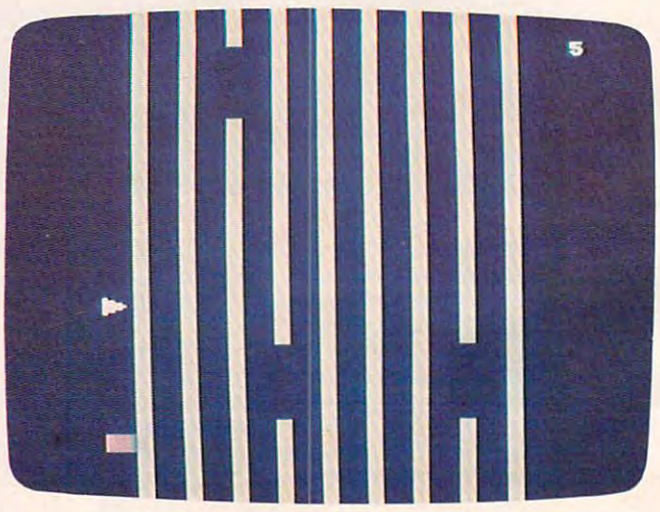
```
5040 NEXT I
5048 REM ASSURES A PASSAGE THROUGH T
     HE MAZE
5050 FOR J=0 TO 31:PM$(768+ST+J,768+
     ST+J)=CHR$(18):NEXT J
5060 FOR J=0 TO 31:PM$(1024+ST+J,102
     4+ST+J)=CHR$(130):NEXT J
5070 FOR J=0 TO 31:PM$(1152+ST+J,115
     2+ST+J)=CHR$(144):NEXT J
5073 PM$(ST,ST+250)=B$:PM$(ST+256,ST
     +506)=B$
5079 PY=128:PX=67
5080 FOR I=1 TO 7:READ A:B$(20+I,20+
     I)=CHR$(A):NEXT I:POKE 53248,PX
     :POKE 704,78:PM$(ST+246+PY,ST+2
     96+PY)=B$(1,57)
5085 FOR I=1 TO 8:READ A:B$(60+I,60+
     I)=CHR$(A):NEXT I
5087 FOR I=1 TO 16:READ A:B$(90+I,90
     +I)=CHR$(A):NEXT I
5090 RETURN
5099 REM HIT WALL
5100 POKE 53278,0
5110 PM$(ST+246+PY,ST+293+PY)=B$(80,
     106)
5120 FOR J=15 TO 0 STEP -2:FOR I=250
      TO 50 STEP -50:SOUND 0,I,6,J:N
     EXT I:NEXT J:SOUND 0,0,0,0
5130 LIVES=LIVES-1
5131 POSITION 35,0:? LIVES;
5182 PM$(ST+246+PY,ST+276+PY)=B$(220
     ,250)
5184 PY=128:PM$(ST+236+PY,ST+283+PY)
     =B$(1,57):PX=67:POKE 53248,PX
5190 RETURN
5199 REM SETS RANDOM PATH FOR ROAMER
5200 J=8:IF PX>66 THEN IF PX<79 THEN
      J=9:GOTO 5220
5201 IF PX>78 THEN IF PX<91 THEN J=8
     :GOTO 5220
5202 IF PX>90 THEN IF PX<103 THEN J=
     7:GOTO 5220
5203 IF PX>102 THEN IF PX<115 THEN J
     =6:GOTO 5220
5204 IF PX>114 THEN IF PX<127 THEN J
     =5:GOTO 5220
5205 IF PX>126 THEN IF PX<139 THEN J
     =4:GOTO 5220
5206 IF PX>138 THEN IF PX<151 THEN J
     =3:GOTO 5220
5207 IF PX>150 THEN J=2
5220 T=INT(J*RND(0))+1:PM=178-T*12-3
     :PMY=230
5230 POKE 53255,PM:POKE 53254,PM+2:P
     OKE 53253,PM+4:POKE 53252,PM+6
5290 RETURN
5399 REM ROAMER HITS PLAYER
5400 POKE 53278,0
5410 FOR I=250 TO 190 STEP -30:FOR J
     =15 TO 8 STEP -1
5420 SOUND 0,I,10,J:SOUND 1,I,6,J-4:
     NEXT J:NEXT I:LIVES=LIVES-1
5480 SOUND 0,0,0,0:SOUND 1,0,0,0
5481 POSITION 35,0:? LIVES;
5490 RETURN
5700 SECS=INT((PEEK(18)*65536+PEEK(1
     9)*256+PEEK(20))/60)
5710 SCR=300-SECS+100*LIVES:SCR=SCR*
     (WIN=1):POKE 623,18
5711 IF SCR>HSCR THEN HSCR=SCR
5720 POSITION 22,0:? "{6 SPACES}LIVE
     S: ";LIVES;
5730 POSITION 22,1:? "  SECONDS: ";S
     ECS;"  ";
5731 POSITION 22,2:? "SCORE: ";SCR;"
     {3 SPACES}";
5732 POSITION 22,3:? "HIGH SCORE: ";
     HSCR
5733 POSITION 22,4:? "PUSH TRIG TO S
     TART"
5740 IF STRIG(0)=1 THEN 5740
5750 GOSUB 5800
5780 POKE 623,17:S1=1:LIVES=5:WIN=0:
     SECS=0:SP=0
5781 POSITION 35,0:? LIVES;
5783 PM$(ST+246+PY,ST+276+PY)=B$(220
     ,250)
5784 PY=128:PM$(ST+236+PY,ST+283+PY)
     =B$(1,57):PX=67:POKE 53248,PX
5790 POKE 18,0:POKE 19,0:POKE 20,0:R
     ETURN
5800 POKE 18,0:POKE 19,0:POKE 20,0
5810 POSITION 22,0:? "{12 SPACES}";
5815 POSITION 22,1:? "{16 SPACES}";
5820 POSITION 22,2:? "{16 SPACES}";
5825 POSITION 22,3:? "{16 SPACES}";
5830 POSITION 22,4:? "{18 SPACES}";
5890 RETURN
10000 DATA 128,224,248,252,248,224,1
      28
10010 DATA 255,255,255,255,255,255,2
      55,255
10020 DATA 24,60,126,255,255,126,60,
      24,24,24,24,24,24,24,90,126
30000 REM PM SETUP
30018 GRAPHICS 0
30022 POKE 559,62:POKE 53277,3:POKE
      623,17
30030 POKE 752,1:? "{CLEAR} ";:POKE
      710,96:POKE 709,12:POKE 712,96
31000 REM FIND PMBASE
31010 ADHI=INT(ADR(PM$)/256):REM ADL
      O=ADR(PM$)-256*ADHI
31020 P=INT((ADHI+8)/8)
31022 POKE 54279,P*8
31030 ST=8*P*256+1024-256-ADR(PM$)
31040 POKE 53249,75:POKE 53250,111:P
      OKE 53251,147
31041 FOR I=1 TO 3:POKE 53256+I,3:PO
      KE 704+I,218:NEXT I
31090 RETURN
32000 SAVE "D:MAZE"
```



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Program 2: Moving Maze — VIC Version

by Marc Sugiyama, Programming Assistant

```
10 POKE55,94:POKE56,29:CLR
15 PRINT"{CLR}"CHR$(8);:SS=36879:CS=36865
   :FF=255:POKECS,FF:F8=484:Z4=4:Z5=5:RL=
   62:RR=63
20 DS=36869:SE=8164:T3=23:F4=44:H4=64:V1=
   36875:DEFFNA(J)=Z3+J*Z3+S+F8*(JANDZ1)
25 DIMT(5),D(4),K(4):Z3=3:SP=160:KS=197:Z
   Q=2:RB=7673:RC=7665:RM=1:BU=198:S2=.94
   :SN=1
30 H8=128:H3=32:S=7680:RS=57:Z0=0:Z1=1:SK
   =5:T2=22:T1=21:SH=57:ML=7518:ZB=176:LI
   =3
35 FORI=1TO4:READD(I),K(I):NEXT:JD=37154:
   J1=JD-3:J2=J1+1:POKEJD,127
40 FORI=1TO7:FORJ=0TO7:READA:POKE7616+I*8
   +J,A:NEXT:NEXT
45 FORI=7518TO7614:READA:POKEI,A:NEXT
50 POKESS-1,10:A$="{RVS}{WHT}{3 SPACES}
   {OFF}{RED}9{RVS}{2 SPACES}{OFF}{CYN}9
   {RVS}{2 SPACES}{OFF}{PUR}9{RVS}
   {2 SPACES}{OFF}{GRN}9{RVS}{2 SPACES}
   {OFF}{BLU}9{RVS}{2 SPACES}{OFF}{YEL}9
   {RVS} ":PRINT"{HOME}";:FORI=0TO21
55 PRINTA$"{RVS}"CHR$(160)" ";:NEXT:PRINT
   A$"{RVS}"CHR$(160)"{HOME}";:POKE8185,1
   60
60 FORI=0TOLI-1:POKES+T1+T2*I,61:NEXT:POK
   ESS,8:POKEDS,FF:POKECS,25:GOTO265
65 POKEV1,240:OE=OE-Z1
70 FORJ=0TO5:IFT(J)=Z0THEN85
75 T(J)=T(J)+Z1:IFT(J)>SKTHENPOKEFNA(J),R
   S:T(J)=Z0
80 GOTO90
85 IFRND(Z1)>S2THENT(J)=Z1:POKEFNA(J),SP
90 NEXT:POKEV1,Z0:POKESL,E1:SYSML:IFPEEK(
   SL)=E1ORPEEK(SL)=SPTHENPOKESL,OS
95 RETURN
100  IFROTHEN110
105 R1=RND(Z1)>.5:RD=T2+F4*R1:RT=INT(RND(
   Z1)*Z5)*Z3+Z4-F8*R1+S
110 POKEV1,200:POKERC+RM,FF:POKERB+RM,FF:
   IFR1THEN125
115 RM=RM+Z1:IFRM>Z4THENRM=Z0
120 GOTO130
125 RM=RM-Z1:IFRM<Z1THENRM=Z5
130 POKERC+RM,H8:POKERB+RM,Z1
135 POKERT,SP:POKERT+Z1,SP:RT=RT+RD:RO=RO
   +Z1:IFRO=T3THENRO=Z0:POKEV1,Z0:RETURN
140 POKERT,RL:POKERT+Z1,RR:POKEV1,Z0:RETU
   RN
145 IFPEEK(SL)<>OSTHENEM=PEEK(SL):GOTO240
150 IF(PEEK(KS)=H3)=Z0AND(PEEK(J1)ANDH3)T
   HEN165
155 ZW=(ZW+Z1)ANDZ3:IFZW=Z0THENZW=Z1
160 ONZWGOSUB65,100,65:GOTO145
165 DI=Z0:A=PEEK(KS):IFA<>H4THEN195
170 IF(PEEK(J2)ANDH8)=Z0THENDI=Z4:GOTO205
175 J=PEEK(J1):IF(JANDZ4)=Z0THENDI=Z1:GOT
   O205
180 IF(JAND8)=Z0THENDI=2:GOTO205
185 IF(JAND16)=Z0THENDI=Z3
190 GOTO205
195 FORI=1TO4:IFA=K(I)THENDI=I
200 NEXT
205 IFDI=Z0THEN235
210 IFDI=Z3THENOE=OE-SN:IFINT((SL-S)/T2)=
   (SL-S)/T2THEN235
215 IFDI=Z4THENOE=OE+SN
220 EL=SL+D(DI):IFEL<SOREL>SE+T1THEN235
225 POKEV1,220:E1=EM:EM=PEEK(EL):IFEM<>SP
   THEN240
230 POKESL,SP:OS=SH+DI:POKEEL,OS:SL=EL
235 ZQ=Z3-ZQ:POKEV1,Z0:ONZQGOSUB70,100:GO
   TO145
240 IFEM<>224THEN255
245 POKEV1,0:SN=SN+1:SK=SK-1:IFSK<2THENSK
   =2
250 FORI=1TO5:POKESS,25:A=TAN(I):POKESS,8
   :A=TAN(I):NEXT:GOTO265
255 POKESL,RS:POKEV1,0:POKEV1+2,129:FORI=
   15TO0STEP-1:POKESS-1,I:A=TAN(I):NEXT
260 POKEV1+2,0:POKESS-1,10:LI=LI-1:IFLI=-
   1THEN270
265 POKESL,E1:SL=7922:OS=61:EM=OS:E1=EM:P
   OKESL,OS:POKES+T1+T2*LI,SP:GOTO145
270 POKEV1,0:POKECS,FF:POKESS,42:POKEDS,2
   40:PRINT"{CLR}{OFF}{2 DOWN}{WHT} YOU
   {SPACE}HAVE USED ALL OF"
275 PRINTSPC(5)"YOUR LIVES...{DOWN}"
280 PRINTSPC(7)"SCORE:"OE:IFOE>HITHENHI=O
   E:PRINT"{RVS}";
285 PRINT"{2 RIGHT}HIGH SCORE{OFF}:"HI:OE
   =0
290 PRINT"{DOWN}{2 SPACES}PLAY AGAIN (Y/N
   )?":POKECS,25:POKEBU,0
295 GETA$:IFA$<>"Y"ANDA$<>"N"THEN295
300 IFA$="Y"THENPOKECS,255:LI=3:SK=5:GOTO
   50
305 PRINT"{CLR}{BLU}";:POKEJD,FF:POKESS,2
   7:END
310 DATA -22,12,22,36,-1,20,1,44
315 DATA 126,126,126,126,126,126,126,126
320 DATA 16,56,108,198,130,254,146,130
325 DATA 130,146,254,130,198,108,56,16
```

VIC Notes

Marc Sugiyama, Programming Assistant

The VIC version of "Moving Maze" (Program 2) uses the same game layout as the Atari version, but the rules of the game have been changed. Whenever you run into a wall or the Rover, you are sent back to the beginning of the maze, without exception. You maneuver through the maze using the I, J, K, and M keys or a joystick. Pressing the space bar or the fire button on the joystick causes the maze to speed up, but you lose one point every time the maze moves. You cannot move while the joystick button or the space bar is depressed. When you complete a maze, another will appear, but the openings in the walls will be smaller. The game ends when you lose all five lives.

Moving Maze uses up almost all of the memory of an unexpanded VIC, so do not enter any extra spaces or REMs. Also, the program will not handle VIC's floating memory, so remove any expansion memory cartridges.

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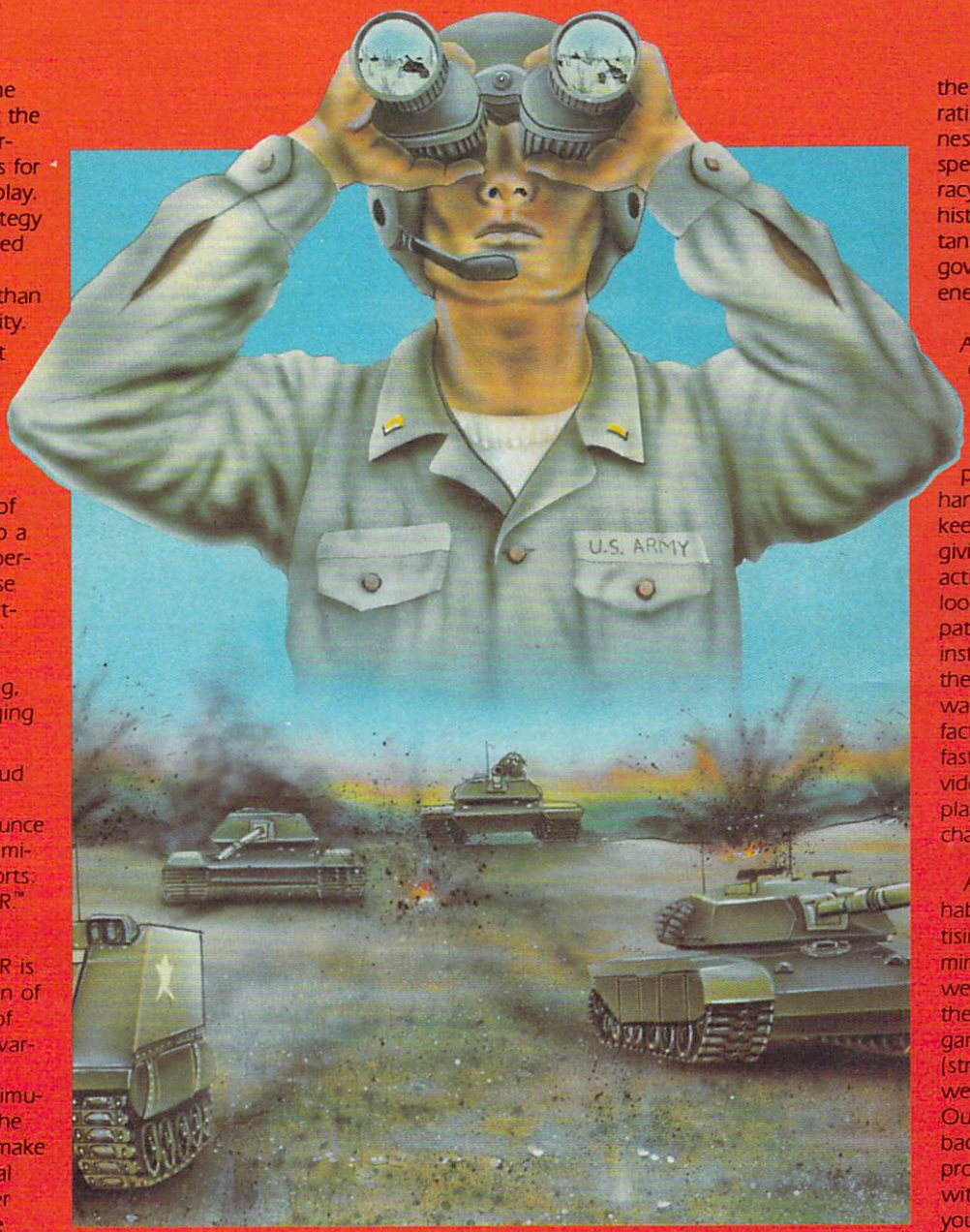

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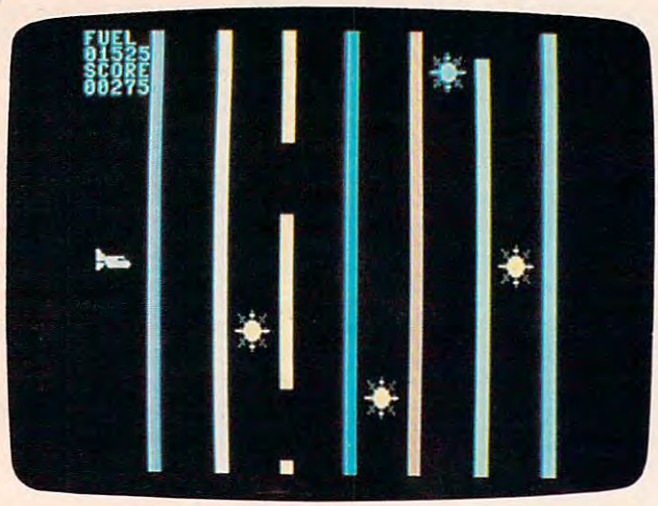
```
330 DATA 31,52,100,198,100,52,31,0
335 DATA 248,44,38,99,38,44,248,0
340 DATA 127,255,255,255,255,255,255,127
345 DATA 254,255,255,255,255,255,255,254
350 DATA 162,3,134,0,160,3,162,22,169,30,
    133,2,169,0,133,1
355 DATA 177,1,133,251,24,165,1,105,22,13
    3,1,144,2,230,2,177
360 DATA 1,133,252,165,251,145,1,165,252,
    133,251,202,208,230,200,200
365 DATA 200,162,22,169,31,133,2,169,228,
    133,1,177,1,133,251,56
370 DATA 165,1,233,22,133,1,176,2,198,2,1
    77,1,133,252,165,251
375 DATA 145,1,165,252,133,251,202,208,23
    0,200,200,200,198,0,208,166,96
```



Guide your shuttle through the maze. 64 version.

Program 3: Shuttle Escape – 64 Version

by Eric Brandon, Programming Assistant

```
100 GOSUB3000
110 PRINTCHR$(142)
120 IF PEEK(49153)<>169 THEN GOSUB 10000:
    GOSUB 50000
130 V=13*4096:CO=50
140 POKE V+16,0
150 POKE V+39,1:POKEV+40,1
160 POKE V+0,CO:POKEV+4,CO-2:POKEV+5,221
170 POKE V+1,200
180 POKE V+2,CO
190 POKE V+3,179
200 POKE V+21,3
210 POKE V+39,1:POKEV+40,1:POKEV+41,8:POK
    EV+42,1
220 POKE 2040,245
230 POKE 2041,246:POKE2043,246
240 POKE 2042,247
250 FOR K=1 TO 500 : NEXT K:POKEV+21,7
260 GOSUB 2000
270 I=200
280 P=1
290 Q=Q+.01*P
300 P=P+.1:C=C+1
310 I=I-Q
320 IF PEEK(2042)=248 THEN POKE 2042,254:
    GOTO340
330 IF PEEK(2042)=254 THEN POKE 2042,248
340 POKE V+1,I:POKEV+3,I-21:POKEV+5,I+21
350 POKES+22,P2:POKES+23,1OR(16-P2/16)*16
360 P2=P2+P2/244
370 IF C=60THEN POKEV+23,4
380 IF C=20THEN POKEV+23,4
390 IF C=40 THEN POKEV+23,0:POKE2042,248
400 IF C<70 THEN 290
410 POKE 2040,249
420 POKE 2043,250:POKEV+6,CO:POKEV+7,I:PO
    KEV+21,15
430 Q=Q+.01*P
440 P=P+.1:C=C+1:C2=C2+.6
450 I=I-Q
460 IF PEEK(2042)=248 THEN POKE 2042,254:
    GOTO480
470 IF PEEK(2042)=254 THEN POKE 2042,248
480 POKE V+1,I:POKEV+5,I+21
490 NR=I+C2*C2:NC=CO+C2*3
500 POKE V+7,NR:POKEV+3,NR-21:POKEV+6,NC:
    POKEV+2,NC
510 IF C=83 THEN POKE 2043,251:POKE2041,253
520 IF C=86 THEN POKE 2043,252
530 IF C=89 THEN POKE V+21,5
540 POKES+22,P2:POKES+23,1OR(16-P2/16)*16
550 P2=P2+P2/244
560 IF I>25 THEN 430
570 POKE S+4,128
580 POKE V+5,I+21
590 I=I-2:IFI>0 THEN580
600 POKE V+21,1
610 FOR J=1 TO 2000:NEXT
620 PRINT"{HOME}{10 RIGHT}{WHT}{2 SPACES}
    ORBIT ACHIEVED...."
630 FOR I=1 TO 1000:NEXT
640 POKE 2040,244
650 POKE V,0:POKEV+1,117
660 FOR I=0 TO 348 STEP2
670 POKE V,I AND 255:POKEV+16,I/255
680 NEXT
690 FOR I=0 TO 1000:NEXT
700 GOTO 4000
710 POKE 53281,12:POKE53280,12:PRINT"{WHT}
720 END
2000 S=54272
2010 POKES+24,15+16+32:POKES+23,1+16*5
2020 POKES+5,0
2030 POKES+6,16*15+15
2040 POKES+4,129
2050 POKES+1,11
2060 P2=100:RETURN
3000 POKE 53281,0:POKE53280,0
3010 PRINT"{CLR}"
3020 PRINT"{5 DOWN}"
3040 T=12
3050 PRINTTAB(T)"{7}{RVS}£{2 SPACES}
     {RIGHT} {RIGHT} {RIGHT} {RIGHT}
     {RIGHT}{3 SPACES}{RIGHT}{3 SPACES}
     {RIGHT} {3 RIGHT}£{2 SPACES}"
3060 PRINTTAB(T)"{RVS} {3 RIGHT} {RIGHT}
     {SPACE}{RIGHT} {RIGHT} {2 RIGHT}
     {3 RIGHT} {2 RIGHT} {3 RIGHT} "
3070 PRINTTAB(T)"{*}{RVS} {*}{RIGHT}
     {3 SPACES}{RIGHT} {RIGHT} {2 RIGHT}
     {SPACE}{3 RIGHT} {2 RIGHT} {3 RIGHT}
     {2 SPACES}"
3080 PRINTTAB(T)"{RVS}{2 RIGHT} {RIGHT}
     {RIGHT} {RIGHT} {RIGHT} {2 RIGHT}
     {3 RIGHT} {2 RIGHT} {3 RIGHT} "
3090 PRINTTAB(T)"{RVS}{2 SPACES}{OFF}£
     {RVS}{RIGHT} {RIGHT} {RIGHT}{OFF}
     {*}{RVS} {OFF}£{RVS}{2 RIGHT}
     {3 RIGHT} {2 RIGHT}{OFF}{*}{RVS}
     {2 SPACES}{RIGHT}{OFF}{*}{RVS}
     {2 SPACES}"
```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64 Notes

Eric Brandon, Programming Assistant

The Commodore 64 version of "Moving Maze" has been renamed "Shuttle Escape," since it has a space shuttle theme.

Shuttle Escape plays much like the other versions. The main difference is that a quantity called FUEL has been added to the game. You begin with 2000 fuel units which you lose at the rate of 60 units each second whether the shuttle is moving or not. If you touch a wall or one of the roving droids, you lose 100 units each 1/60 second. When you have run out of fuel, the game is over. Fortunately, you can refill your tanks by reaching the right-hand side of the screen.

If you want to stop the game for a moment, just hold down the SHIFT key. If you want to stop the game for a longer period of time, use SHIFT LOCK.

You can speed up the movement of the walls by holding down the fire button on the joystick. This won't make gaps appear any sooner, but it will speed up any gaps that are already there. The penalty is that while the fire button is down, your fuel disappears twice as fast.

Programming Shuttle Escape revealed some interesting problems. The first is that *sparkle* – little specks of snow – appears on the screen. Usually this causes no difficulty, but when you try to use the VIC-II's sprite-background collision detection register, it turns out that sprites can collide with sparkle!

What this meant to Shuttle Escape was that occasionally, for no apparent reason, the shuttle would "collide" and you would lose 100 fuel units. Since moving the character set eliminates sparkle, it was relocated to $3000.

Another quirk of the 64 is that the VIC-II chip can look at only 16K of memory at a time. When you turn on your machine, it is looking at the first 16K block from $0000-$3FFF. It was decided to leave it there for simplicity. This meant that the sprite data, the relocated character set, and the entire BASIC program all had to be squeezed into 16K. Because of this memory limitation, when the machine language creates a character set at $3000, it destroys the DATA statements in the program. Fortunately, the DATA statements are no longer needed since they have already been POKEd into memory.

Because running the program will destroy it, be sure that when you type it in, you SAVE it before you try to RUN.

```
3100 PRINT
3110 PRINTTAB(T)"{CYN}{RVS}£{2 SPACES}
     {RIGHT}£{2 SPACES}{RIGHT}£
     {2 SPACES}{RIGHT}£ £*£{RIGHT}
     {2 SPACES}£*£{RIGHT}£{2 SPACES}"
3120 PRINTTAB(T)"{RVS} {3 RIGHT}
     {3 RIGHT} {3 RIGHT} {RIGHT} {RIGHT}
     {SPACE}{RIGHT} {RIGHT} "
3130 PRINTTAB(T)"{RVS}{2 SPACES}{2 RIGHT}
     {OFF}£*£{RVS} £*£{RIGHT}
     {3 RIGHT}{3 SPACES}{RIGHT}{2 SPACES}
     {OFF}£{RIGHT}{RVS}{2 SPACES}"
3140 PRINTTAB(T)"{RVS} {5 RIGHT} {RIGHT}
     {SPACE}{3 RIGHT} {RIGHT} {RIGHT}
     {3 RIGHT} "
3150 PRINTTAB(T)"£*£{RVS}{2 SPACES}
     {RIGHT}{2 SPACES}{OFF}£ £*£{RVS}
     {2 SPACES}{RIGHT} {RIGHT} {RIGHT}
     {3 RIGHT}{OFF}£*£{RVS}{2 SPACES}"
3999 RETURN
4000 V=13*4096:POKE53281,0:POKE53280,0
4010 POKE V+21,0:POKEV+23,0
4020 GOSUB 2000:POKE S+5,7*16:POKES+6,249
     :POKES+4,128
4030 POKE V+40,03:POKEV+41,07:POKEV+42,03
     :POKEV+43,07:POKEV+44,03:POKEV+45,07
4040 POKE V+46,03:FOR I=1 TO 6 : POKE V+2
     *I,(36+40*I)AND255:NEXT
4050 POKE V+16,64:POKE 2040,244:POKEV,30:
     POKEV+1,148:POKE V+21,255
4060 FOR I=2041 TO 2047:POKEI,255:NEXT
4070 PRINT"{CYN}{CLR}FUEL
4080 PRINT"02000"
4090 PRINT"SCORE:"
4100 PRINT"00000"
4110 P(0)=1029:P(4)=1994:P(1)=1039:P(5)=2
     004:P(2)=1049:P(6)=2014:P(3)=1059
4120 SYS 49152
4130 POKE P(0),227
4140 IF PEEK(2)=255 THEN 20000
4150 IF PEEK(653)=1 THEN 4150
4160 IF RND(1)>.05 THEN 4140
4170 IF RND(1)>.5 THEN 4200
4180 P=RND(1)*5:IF PEEK(P(P))<>160 THEN 4
     180
4190 POKE P(P),227:GOTO4140
4200 P=RND(1)*3+4:IF PEEK(P(P))<>160 THEN
      4200
4210 POKE P(P),228:GOTO4140
5000 FB=(J AND 16)
5010 IFFL=0AND FB=0 THEN POKE 2,0:POKE 49
     290,2:GOTO 5030
5020 IF FL=16 AND FB=16 THEN POKE 2,0:POK
     E 49290,3
5030 FL=FB
5040 IF (J AND 8)=0 AND DX<4 THEN DX=DX+1
     :GOTO5060
5050 IF (J AND 4)=0 AND DX>-4 THEN DX=DX-1
5060 IF (J AND 1)=0 AND DY>-4 THEN DY=DY-
     1:GOTO5080
5070 IF (J AND 2)=0 AND DY<4 THEN DY=DY+1
5080 X=PEEK(V)+PEEK(V+16)*256
5085 Y=PEEK(V+1)
```


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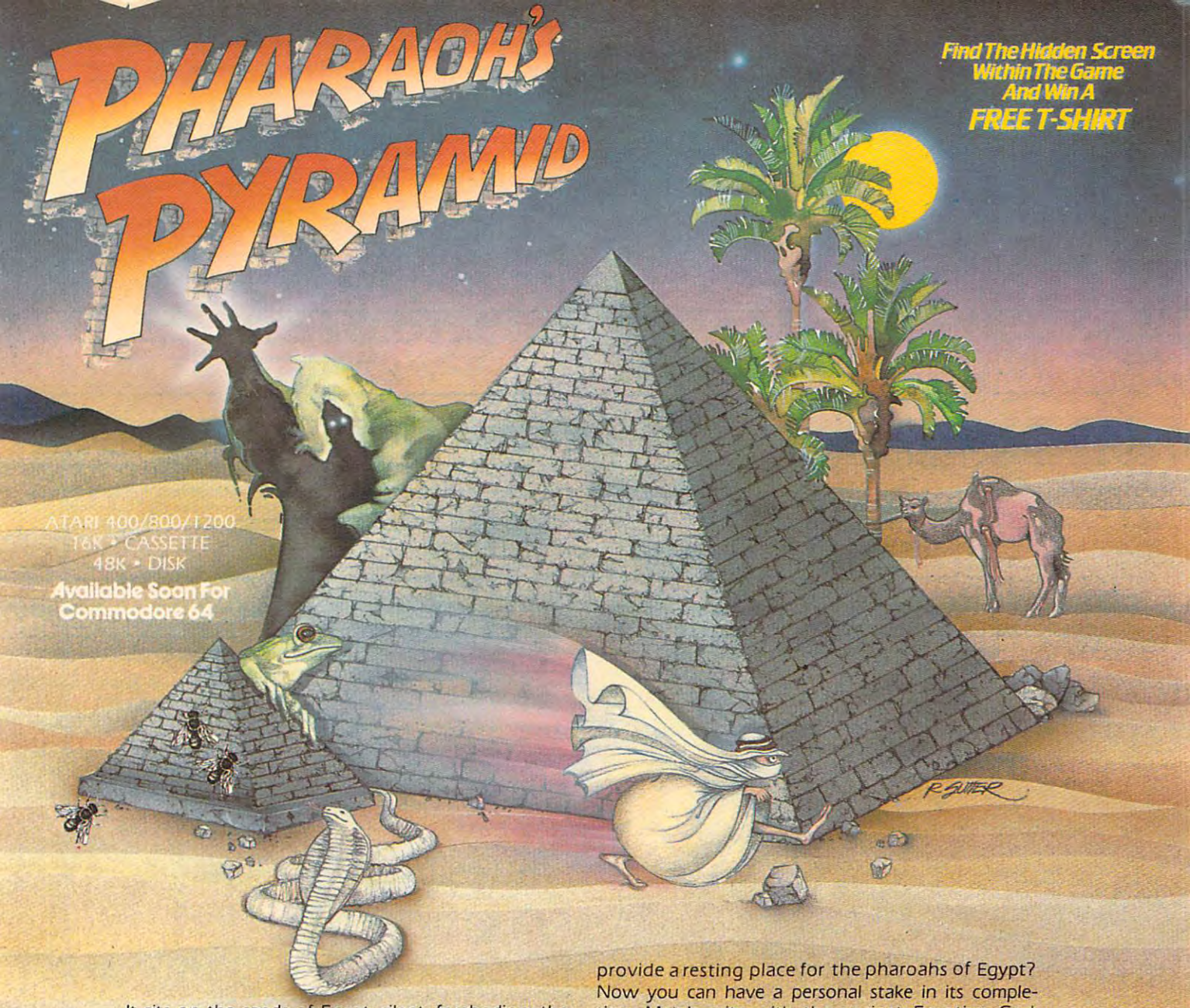

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```
5090 NX=X+DX:IF NX>21 AND NX<358 THEN POK
     E V,NXAND255:POKEV+16,NX/256
5100 NY=Y+DY:IF NY<20 THEN NY=210
5110 IF NY>210 THEN NY=20
5120 POKE V+1,NY
5130 RETURN
10000 I=15616:TI$="000000"
10005 PRINT"{HOME}{WHT}{12 RIGHT}READY IN
      "LEFT$(STR$(149-INT(TI/60)),4)" SEC
      ONDS "
10010 READ A:IF A=256 THEN 10025
10020 C1=C1+A:POKE I,A:I=I+1:GOTO 10005
10025 IF C1<>34430 THEN PRINT"CHECKSUM ER
      ROR IN LINE 10025":END
10026 RETURN
10030 DATA 0,0,0,0,0,0,0,0
10040 DATA 0,0,24,0,0,28,0
10050 DATA 0,31,0,0,31,255,240
10060 DATA 31,255,8,20,255,254,31
10070 DATA 127,255,30,63,254,24,0
10080 DATA 0,0,0,0,0,0,0,0
10090 DATA 0,0,0,0,0,0,0,0
10100 DATA 0,0,0,0,0,0,0,0
10110 DATA 0,0,0,0,0,0,0,0
10120 DATA 0,0,71,192,0,247,192
10130 DATA 0,247,192,1,255,192,2
10140 DATA 255,192,2,255,192,2,247
10150 DATA 192,2,247,192,3,247,192
10160 DATA 3,247,192,3,247,192,3
10170 DATA 247,192,3,247,192,3,247
10180 DATA 192,3,255,192,3,255,192
10190 DATA 7,103,192,7,103,192,15
10200 DATA 229,128,31,119,128,31,240
10210 DATA 0,0,0,0,0,0,0,0
10220 DATA 0,0,0,0,0,0,0,0
10230 DATA 0,0,0,0,0,0,0,0
10240 DATA 0,0,0,0,0,0,0,0
10250 DATA 0,0,0,0,0,0,0,0
10260 DATA 0,0,0,0,0,0,0,0
10270 DATA 0,0,0,0,0,0,0,0
10280 DATA 0,0,3,128,0,15,192
10290 DATA 0,15,192,0,15,192,0
10300 DATA 15,192,0,1,252,0,1
10310 DATA 116,0,1,212,0,0,88
10320 DATA 0,0,80,0,0,0,0
10330 DATA 0,0,0,0,0,0,0,0
10340 DATA 0,0,0,0,0,0,0,0
10350 DATA 0,0,0,0,0,0,0,0
10360 DATA 0,0,0,0,0,0,0,0
10370 DATA 0,0,0,0,0,0,0,0
10380 DATA 0,0,0,0,0,0,0,0
10390 DATA 0,0,0,0,1,252,0
10400 DATA 1,252,0,1,252,0,1
10410 DATA 254,0,7,248,0,6,249
10420 DATA 0,2,251,0,6,122,0
10430 DATA 3,242,0,0,248,0,0
10440 DATA 248,0,0,60,0,0,120
10450 DATA 0,0,56,0,0,56,0
10460 DATA 0,96,0,0,96,0,0
10470 DATA 8,0,0,32,0,0,0
10480 DATA 0,0,0,0,0,0,64
10490 DATA 0,0,240,0,0,240,0
10500 DATA 1,240,0,2,240,0,2
10510 DATA 240,0,2,240,0,2,240
10520 DATA 0,3,240,0,3,240,0
10530 DATA 3,240,0,3,240,0,3
10540 DATA 240,0,3,240,0,3,240
10550 DATA 0,3,240,0,7,96,0
10560 DATA 7,96,0,15,224,0,31
10570 DATA 112,0,31,240,0,0,0
10580 DATA 7,192,0,7,192,0,7
10590 DATA 192,0,7,192,0,7,192
10600 DATA 0,7,192,0,7,192,0
10610 DATA 7,192,0,7,192,0,7
10620 DATA 192,0,7,192,0,7,192
10630 DATA 0,7,192,0,7,192,0
10640 DATA 7,192,0,7,192,0,7
10650 DATA 192,0,7,192,0,7,192
10660 DATA 0,3,128,0,0,0,0
10670 DATA 0,2,0,0,7,192,0
10680 DATA 7,192,0,6,192,0,4
10690 DATA 192,0,3,64,0,6,192
10700 DATA 0,1,192,0,4,0,0
10710 DATA 7,192,0,7,128,0,7
10720 DATA 64,0,7,192,0,1,192
10730 DATA 0,5,192,0,6,64,0
10740 DATA 7,192,0,7,192,0,0
10750 DATA 128,0,3,128,0,0,0
10760 DATA 0,0,2,0,0,1,0
10770 DATA 0,6,64,0,0,64,0
10780 DATA 4,128,0,3,64,0,6
10790 DATA 0,0,1,0,0,0,0
10800 DATA 0,0,0,0,0,128,0
10810 DATA 1,64,0,6,0,0,1
10820 DATA 0,0,5,0,0,6,64
10830 DATA 0,0,0,0,4,0,0
10840 DATA 0,128,0,3,128,0,0
10850 DATA 0,0,0,0,0,0,0
10860 DATA 0,0,0,0,0,0,0
10870 DATA 0,0,0,0,0,0,0
10880 DATA 0,0,0,0,0,0,0
10890 DATA 0,0,0,0,0,0,0
10900 DATA 0,0,0,0,0,0,0
10910 DATA 0,0,0,0,0,0,0
10920 DATA 0,0,1,128,0,6,128
10930 DATA 0,2,64,0,5,192,0
10940 DATA 3,128,0,1,252,0,1
10950 DATA 252,0,1,236,0,1,126
10960 DATA 0,3,248,0,2,120,0
10970 DATA 0,248,0,0,120,0,0
10980 DATA 112,0,0,120,0,0,120
10990 DATA 0,0,48,0,0,48,0
11000 DATA 0,0,0,0,0,0,0
11010 DATA 0,0,0,0,0,0,0
11020 DATA 0,0,0,0,0,0,0
11030 DATA 0,0,0,0,0,0,0
11040 DATA 0,16,0,0,16,0,16
11050 DATA 56,16,10,16,160,4,16
11060 DATA 64,10,124,160,1,255,0
11070 DATA 1,255,0,11,255,144,127
11080 DATA 255,252,11,255,144,1,255
11090 DATA 0,1,255,0,10,124,160
11100 DATA 4,16,64,10,16,160,16
11110 DATA 56,16,0,16,0,0,16
11120 DATA 0,0,0,0,0,0,256
20000 SC=0:FOR I=0 TO 4:SC=SC+(PEEK(1148-
      I)-48)*10↑I:NEXT I
20010 IF H<SC THEN H=SC
20020 POKE S+4,128
20030 POKE 13*4096+21,0
20040 FOR I=1 TO 1000:NEXT I
20050 PRINT"{CLR}OUT OF FUEL...{DOWN}
20060 PRINT"YOU SCORED{WHT}"SC"{CYN}POINTS
20070 PRINT"HIGH SCORE{WHT}"H"{CYN}
20080 PRINT"{3 DOWN}{11 SPACES}AGAIN? (Y
      {SPACE}OR N)"
20090 PRINT"{DOWN} OR PRESS FIRE BUTTON T
      O START AGAIN"
20100 GETA$
20110 IF A$="N"THEN END
20120 IF (PEEK(56320) AND 16)=0 THEN GOTO
      4000
```


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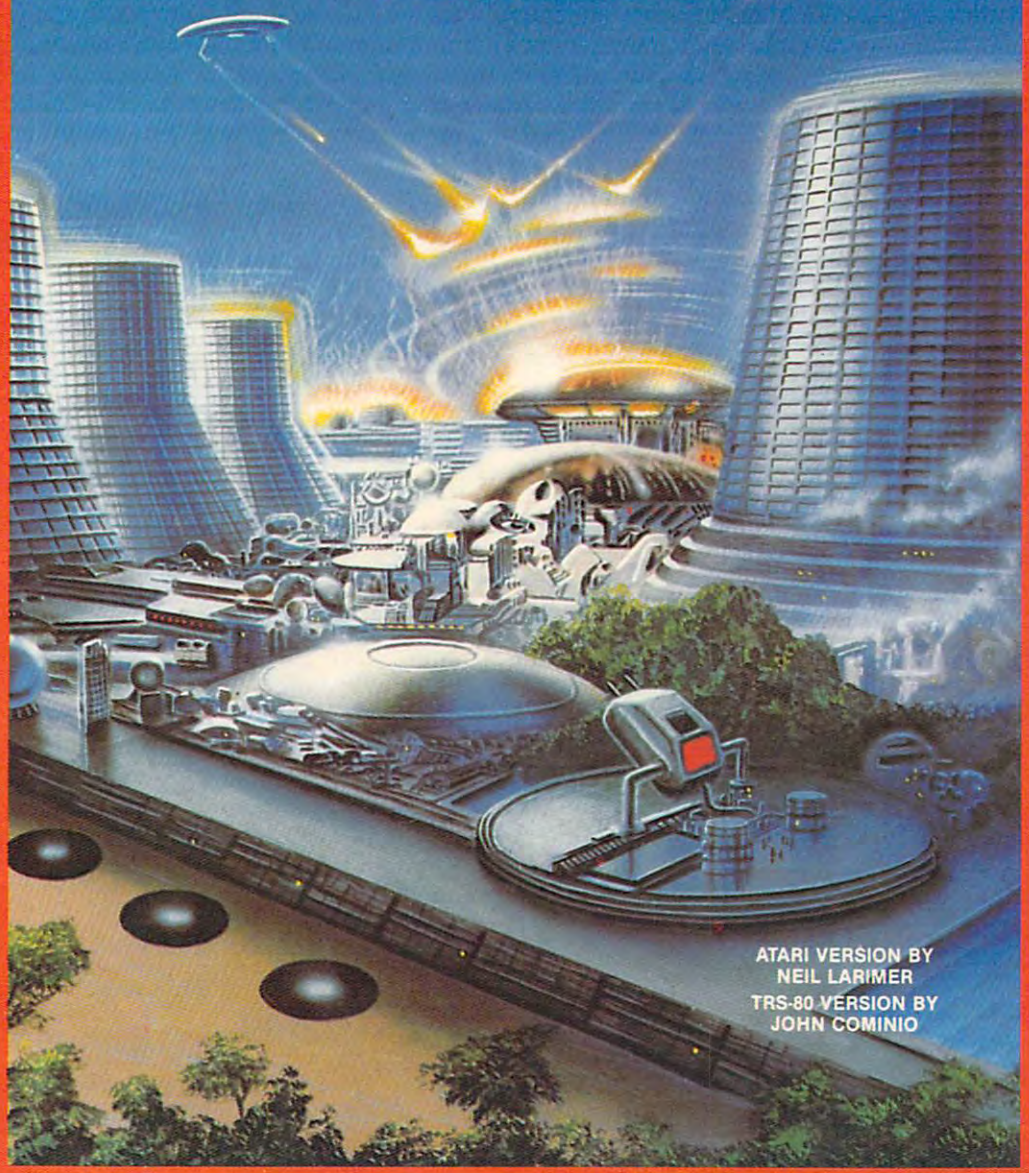
STRATOS



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```
20130 IF A$<>"Y" THEN 20100
20140 GOTO4000
50000 I=49152:TI$="000000"
50010 PRINT"{HOME}{WHT}{12 RIGHT}READY IN
      "LEFT$(STR$(103-INT(TI/60)),4)" SEC
      ONDS "
50015 READ A:IF A=256 THEN PRINT"{HOME}
      {10 RIGHT}{21 SPACES}{SHIFT-SPACE}"
      :GOTO50045
50020 IF A=-1 THEN I=49920 : GOTO 50010
50030 IF A=-2 THEN I=50688 : GOTO 50010
50040 C2=C2+A:POKE I,A:I=I+1:GOTO 50010
50045 IF C2<>188431 THEN PRINT"CHECKSUM E
      RROR IN LINE 50045":END
50046 RETURN
50050 DATA 120,169,0,141,20,3,169
50060 DATA 195,141,21,3,88,173,14
50070 DATA 220,41,254,141,14,220,165
50080 DATA 1,41,251,133,1,160,0
50090 DATA 185,0,208,153,0,48,185
50100 DATA 0,50,153,0,50,185,0
50110 DATA 209,153,0,49,185,0,211
50120 DATA 153,0,51,185,0,212,153
50130 DATA 0,52,185,0,213,153,0
50140 DATA 53,185,0,214,153,0,54
50150 DATA 185,0,215,153,0,55,169
50160 DATA 15,141,156,200,200,208,200
50170 DATA 165,1,9,4,133,1,173
50180 DATA 14,220,9,1,141,14,220
50190 DATA 169,28,141,24,208,169,15
50200 DATA 141,156,200,169,255,141,15
50210 DATA 212,169,128,141,18,212,169
50220 DATA 0,133,2,141,224,207,141
50230 DATA 255,207,141,254,207,141,253
50240 DATA 207,141,252,207,141,249,207
50250 DATA 160,6,169,20,153,0,207
50260 DATA 169,0,153,16,207,136,208
50270 DATA 243,169,251,141,251,207,160
50280 DATA 0,169,4,133,252,132,251
50290 DATA 169,216,133,254,132,253,169
50300 DATA 160,160,5,145,251,160,10
50310 DATA 145,251,160,15,145,251,160
50320 DATA 20,145,251,160,25,145,251
50330 DATA 160,30,145,251,160,35,145
50340 DATA 251,165,251,24,105,40,133
50350 DATA 251,144,2,230,252,201,232
50360 DATA 208,211,169,1,160,10,145
50370 DATA 253,169,4,160,5,145,253
50380 DATA 169,7,160,15,145,253,169
50390 DATA 14,160,20,145,253,169,8
50400 DATA 160,25,145,253,169,13,160
50410 DATA 30,145,253,169,3,160,35
50420 DATA 145,253,165,253,24,105,40
50430 DATA 133,253,144,2,230,254,201
50440 DATA 232,208,199,96,-1
50450 DATA 173,141
50460 DATA 2,201,1,208,3,76,49
50470 DATA 234,230,2,165,2,201,2
50480 DATA 240,3,76,49,234,169,0
50490 DATA 133,2,169,3,133,252,169
50500 DATA 216,133,251,160,45,177,251
50510 DATA 32,79,195,160,55,177,251
50520 DATA 32,79,195,160,65,177,251
50530 DATA 32,79,195,160,75,177,251
50540 DATA 32,79,195,165,251,24,105
50550 DATA 40,133,251,144,2,230,252
50560 DATA 201,192,208,213,76,0,198
50570 DATA 201,160,240,19,201,32,240
50580 DATA 37,162,1,232,221,174,195
50590 DATA 208,250,202,189,174,195,145
50600 DATA 251,96,152,56,233,40,168
50610 DATA 177,251,201,32,240,1,96
50620 DATA 152,24,105,40,168,169,227
50630 DATA 145,251,96,165,252,201,3
50640 DATA 240,22,152,56,233,40,168
50650 DATA 177,251,201,160,240,1,96
50660 DATA 152,24,105,40,168,169,99
50670 DATA 145,251,96,152,24,105,120
50680 DATA 168,177,251,201,100,240,1
50690 DATA 96,152,56,233,120,168,169
50700 DATA 99,145,251,96,160,228,239
50710 DATA 249,226,120,119,99,32,32
50720 DATA 100,111,121,98,248,247,227
50730 DATA -2,169,7,133,252
50740 DATA 169,32,133,251,160,170,177
50750 DATA 251,32,47,198,160,180,177
50760 DATA 251,32,47,198,160,190,177
50770 DATA 251,32,47,198,165,251,56
50780 DATA 233,40,133,251,176,2,198
50790 DATA 252,201,56,208,220,76,160
50800 DATA 198,201,160,240,19,201,32
50810 DATA 240,37,162,1,232,221,142
50820 DATA 198,208,250,202,189,142,198
50830 DATA 145,251,96,152,24,105,40
50840 DATA 168,177,251,201,32,240,1
50850 DATA 96,152,56,233,40,168,169
50860 DATA 228,145,251,96,165,251,201
50870 DATA 32,240,22,152,24,105,40
50880 DATA 168,177,251,201,160,240,1
50890 DATA 96,152,56,233,40,168,169
50900 DATA 100,145,251,96,152,56,233
50910 DATA 120,168,177,251,201,99,240
50920 DATA 1,96,152,24,105,120,168
50930 DATA 169,100,145,251,96,32,99
50940 DATA 119,120,226,249,239,228,160
50950 DATA 160,227,247,248,98,121,111
50960 DATA 100,32,173,0,220,72,41
50970 DATA 15,201,15,240,8,169,129
50980 DATA 141,4,212,76,183,198,169
50990 DATA 128,141,4,212,104,41,16
51000 DATA 205,255,207,240,48,141,255
51010 DATA 207,201,16,208,24,169,2
51020 DATA 141,15,195,169,1,141,252
51030 DATA 198,141,229,200,169,0,141
51040 DATA 250,207,141,224,207,76,239
51050 DATA 198,169,1,141,15,195,169
51060 DATA 2,141,252,198,141,229,200
51070 DATA 169,0,133,2,32,245,198
51080 DATA 76,32,200,238,250,207,173
51090 DATA 250,207,201,1,240,1,96
51100 DATA 169,0,141,250,207,173,0
51110 DATA 220,141,254,207,41,1,208
51120 DATA 13,173,253,207,201,253,240
51130 DATA 23,206,253,207,76,45,199
51140 DATA 173,254,207,41,2,208,10
51150 DATA 173,253,207,201,3,240,3
51160 DATA 238,253,207,173,254,207,41
51170 DATA 8,208,13,173,252,207,201
51180 DATA 3,240,23,238,252,207,76
51190 DATA 82,199,173,254,207,41,4
51200 DATA 208,10,173,252,207,201,253
51210 DATA 240,3,206,252,207,173,254
51220 DATA 207,41,3,201,3,208,16
51230 DATA 173,253,207,240,11,16,6
51240 DATA 238,253,207,76,107,199,206
51250 DATA 253,207,173,254,207,41,12
51260 DATA 201,12,208,16,173,252,207
51270 DATA 240,11,16,6,238,252,207
51280 DATA 76,132,199,206,252,207,174
51290 DATA 249,207,208,32,174,240,207
51300 DATA 224,60,176,25,173,253,207
51310 DATA 24,109,1,208,201,80,176
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51320 DATA 5,169,244,76,191,199,201
51330 DATA 244,144,27,169,80,76,191
51340 DATA 199,173,253,207,24,109,1
51350 DATA 208,201,41,176,5,169,244
51360 DATA 76,191,199,201,244,144,2
51370 DATA 169,41,141,1,208,173,252
51380 DATA 207,48,32,24,109,0,208
51390 DATA 141,240,207,173,249,207,105
51400 DATA 0,141,249,207,201,1,208
51410 DATA 42,173,240,207,201,55,144
51420 DATA 35,32,155,200,76,4,200
51430 DATA 24,109,0,208,141,240,207
51440 DATA 173,249,207,105,255,141,249
51450 DATA 207,208,12,173,240,207,201
51460 DATA 25,176,5,169,25,141,240
51470 DATA 207,173,240,207,141,0,208
51480 DATA 173,16,208,41,254,13,249
51490 DATA 207,141,16,208,173,31,208
51500 DATA 41,1,240,3,76,101,200
51510 DATA 96,162,5,189,119,4,201
51520 DATA 57,240,6,254,119,4,76
51530 DATA 58,200,169,48,157,119,4
51540 DATA 202,208,235,76,58,200,162
51550 DATA 5,189,39,4,201,48,240
51560 DATA 6,222,39,4,76,222,200
51570 DATA 169,57,157,39,4,202,208
51580 DATA 235,120,169,234,141,21,3
51590 DATA 169,49,141,20,3,88,169
51600 DATA 255,133,2,76,222,200,0
51610 DATA 162,0,160,240,238,32,208
51620 DATA 232,208,250,200,208,247,169
51630 DATA 0,141,32,208,162,3,189
51640 DATA 39,4,201,48,240,4,222
51650 DATA 39,4,96,169,57,157,39
51660 DATA 4,202,208,237,162,5,169
51670 DATA 48,157,39,4,202,208,250
51680 DATA 104,104,76,81,200,160,15
51690 DATA 162,3,189,39,4,201,57
51700 DATA 240,6,254,39,4,76,180
51710 DATA 200,169,48,157,39,4,202
51720 DATA 208,235,136,208,230,169,0
51730 DATA 141,249,207,169,25,141,240
51740 DATA 207,169,148,141,1,208,172
51750 DATA 156,200,192,9,240,4,136
51760 DATA 140,156,200,173,5,4,201
51770 DATA 160,208,5,169,227,141,5
51780 DATA 4,96,238,224,207,173,224
51790 DATA 207,201,1,240,3,76,124
51800 DATA 201,169,0,141,224,207,173
51810 DATA 27,212,201,7,176,25,168
51820 DATA 185,0,207,201,20,208,8
51830 DATA 169,1,153,16,207,76,16
51840 DATA 201,201,255,208,5,169,255
51850 DATA 153,16,207,160,6,185,0
51860 DATA 207,24,121,16,207,153,0
51870 DATA 207,72,152,10,170,104,157
51880 DATA 1,208,136,208,235,160,6
51890 DATA 185,0,207,201,20,240,10
51900 DATA 201,255,240,6,136,208,242
51910 DATA 76,66,201,169,0,153,16
51920 DATA 207,76,52,201,173,30,208
51930 DATA 41,1,240,51,162,0,160
51940 DATA 240,238,32,208,232,208,250
51950 DATA 200,208,247,169,0,141,32
51960 DATA 208,162,3,189,39,4,201
51970 DATA 48,240,6,222,39,4,76
51980 DATA 49,234,169,57,157,39,4
51990 DATA 202,208,235,162,5,169,48
52000 DATA 157,39,4,202,208,250,76
52010 DATA 49,234,256
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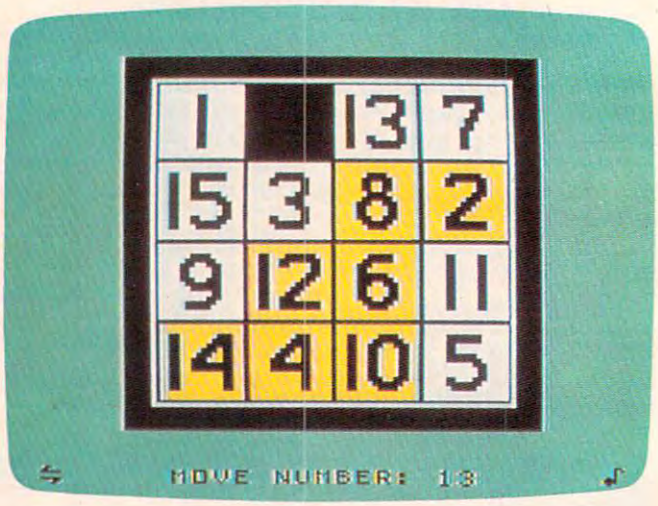
Bruce Jordan

Remember that once-popular sliding-squares game? With only one free space, you tried to move the colored plastic tiles around to get a particular sequence or color pattern. Although it was a challenge, this computer variation of the game can be a mind-boggling test of skill and dexterity. Versions for VIC, 64, Atari, and the TI-99/4A.



A game is just underway in the TI version of "Mosaic Puzzle."

"Mosaic Puzzle" is a computer version of those sliding-squares puzzles that used to drive people nuts before the advent of Rubik's Cube. It can run on either an unexpanded or 3K expanded VIC. The object of the game is to arrange the 15 numbered squares (hexadecimal numbers 1-F in this version) into some predetermined order by sliding them around in their frame. The first few moves are easy, but as the game progresses, it gets a lot more complicated. You'll find yourself rearranging everything just to get the last few squares in place.

This version of the game has a timer for up to 23 hours, 59 minutes, 59 seconds, and a chicken switch. It also automatically checks for the winning order and allows you to go back to the puzzle the way you left it or reset it to the beginning arrangement.

When you start the game, you're asked if you wish to set a time limit. If you answer Y for yes, enter the time limit in one line with no spaces or punctuation between the values. For example, for a 1-hour, 23-minute limit, enter 012300.

Next, enter the goal order. This will be the order that you will try to match to win the game. When this is done, the upper half of the screen will clear, and the puzzle will appear. A moment later, the message !GO! will flash on the screen, along with a tone. The controls for moving the squares are as follows:

@ up
?/ down
= right
: left

If you succeed in getting the squares in the goal order, the message YOU WIN! appears on the screen, accompanied by a short tune and the elapsed time. If the time runs out before you are finished, you'll hear an unpleasant sound. If you want to stop the game, press RETURN and the screen will display the elapsed time. You can then restart the game, either as you left it or reset, by hitting RETURN a second time.

Below is a brief description of the program as originally written on the VIC.

Line 1 sets the limit of memory at 7600. This gives a place to store the image of the puzzle.

Lines 2-5 define variables. Note that S, SC, and SS are defined in two consecutive lines. This is done because there are two possible entry points when restarting the game.

Lines 10-66 GET the time limit.

Lines 70-290 GET the goal order and make sure that no number is entered more than once.

Lines 300-365 put the puzzle on the screen, either from the data table or from memory, then

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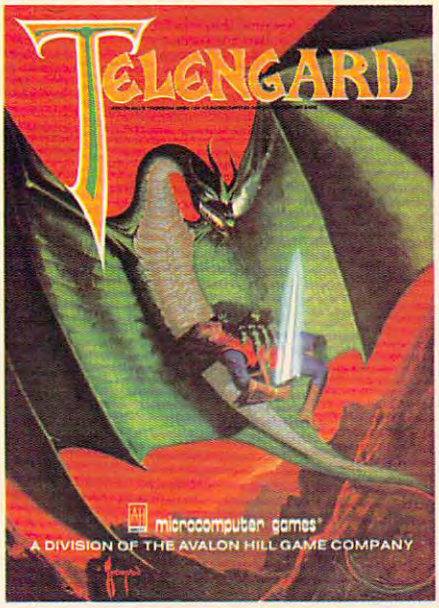
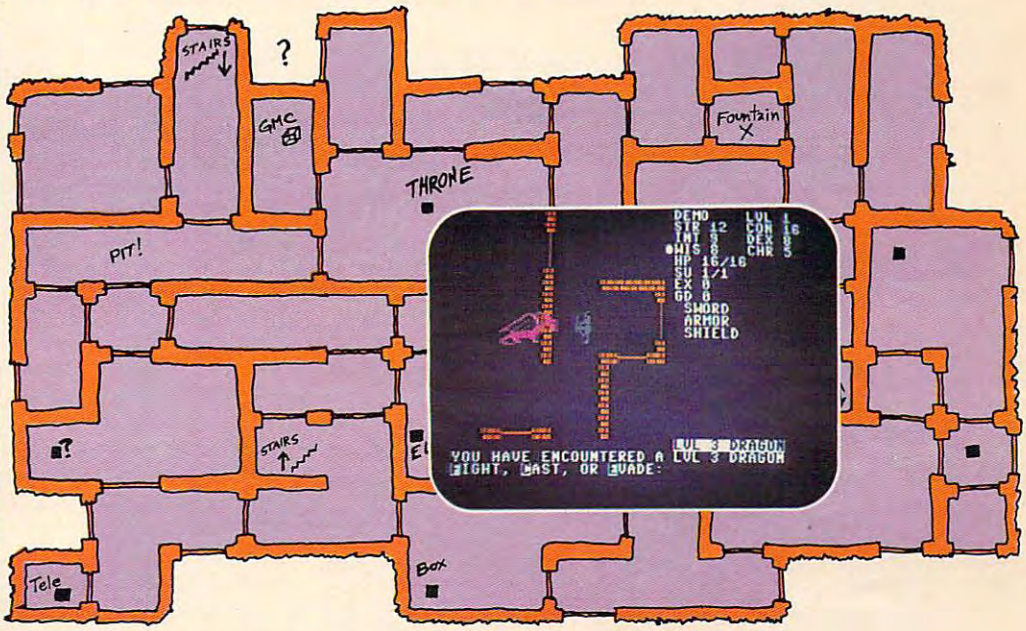
Be Amazed!





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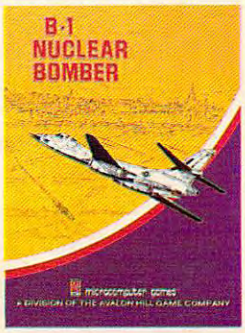
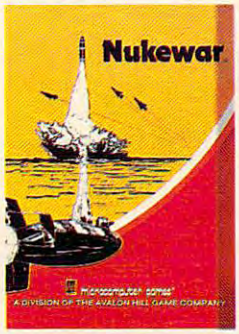
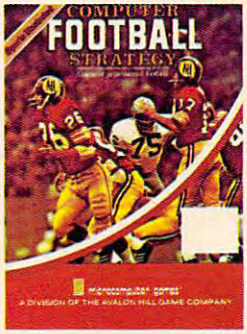




AH QUALITY



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print the go message and start the timer.

Lines 360-560 check the timer, move the number squares, and check for the winning order.

Lines 570-710 print the winning or losing message, display the elapsed time, and play the sound effects.

Lines 720-740 save the position of the blank square, then clear the variables and reset the game.

Lines 745-790 are the DATA statements for the puzzle's beginning order and the winning tune.

Program 1: Mosaic Puzzle – VIC Version

BEGINNING PROGRAMMERS
If you're new to computing, please read "How To Type COMPUTE!'s Programs" and "A Beginner's Guide To Typing In Programs."

```
1 POKE55,176:POKE56,29:CLR
2 S=7845:SC=38565:SS=7603:GOTO4
3 SS=7603:S=PEEK(SS)*256+PEEK(SS+1):SC=S+
  30720
4 DIMA$(16)
5 PRINT"{CLR}":G=8018:X=0:DX=1:P=38738:V=
  36878:S1=36876:S2=36877:POKEV,15
10 PRINT"TIME LIMIT? {RVS}{GRN}Y{OFF}
   {RVS}{PUR}N{OFF}{BLU}"
20 GETA$:IFA$=""THEN20
30 IFA$<"N"ORA$>"Y"THEN20
40 IFA$=>"O"ANDA$<="X"THEN20
50 IFA$="N"THEN70
60 PRINT"{CLR}":INPUT"HRS:MINS:SEC";T$:H=
   1:IFLEN(T$)<>6THEN60
62 IFLEFT$(T$,2)>"23"ORLEFT$(T$,2)<"0"THE
   N60
64 IFMID$(T$,3,2)>"59"ORMID$(T$,3,2)<"0"T
   HEN60
66 IFRIGHT$(T$,2)>"59"ORRIGHT$(T$,2)<"0"T
   HEN60
70 PRINT"{CLR}"TAB(24)"TYPE IN GOAL ORDER
   "
80 PRINT"{DOWN}{3 SPACES}1 2 3 4 5 6 7 8
   {SPACE}9"SPC(8)"A B C D E F {RVS}S
   {OFF}"TAB(49)"IN ANY ORDER"
90 PRINTTAB(118)"GOAL"TAB(30)"{4 Y}"
100 FORK=0TO3:POKE7996+K,100:POKE8106+K,9
    9:POKE38716+K,0:POKE38826+K,0:NEXTK
110 FORK=22TO88STEP22:POKE7995+K,103:POKE
    8000+K,101:POKE38715+K,0:POKE38720+K,
    0:NEXTK
130 FORI=1TO16STEP1
140 GETA$(I):IFA$(I)=""THEN140
150 FORL=I-1TO0STEP-1:IFA$(I)=A$(L)THEN14
    0
160 NEXTL
165 IFA$(I)="S"THEN190
170 IFA$(I)<="0"ORA$(I)=>"G"THEN140
180 IFA$(I)=>":"ANDA$(I)<="@"THEN140
190 B=VAL(A$(I)):C=B+48:IFB=0THEN220
200 POKE38467+2*B,7:POKEG+X,C:POKEP+X,0:X
    =X+DX:IFX=4THENG=G+22:P=P+22:X=0
210 NEXTI:IFI=17THEN300
220 IFA$(I)="A"THENB=1
230 IFA$(I)="B"THENB=2
240 IFA$(I)="C"THENB=3
250 IFA$(I)="D"THENB=4
260 IFA$(I)="E"THENB=5
270 IFA$(I)="F"THENB=6
272 B2=B
275 IFA$(I)="S"THENB=7:B2=32
280 POKE38492+2*B,7:POKEG+X,B2:POKEP+X,0:
    X=X+DX:IFX=4THENG=G+22:P=P+22:X=0
290 NEXTI
300 FORR=0TO132:POKE7702+R,32:POKE38422+R
    ,1:NEXTR
310 PRINT"{HOME}"TAB(29)"PUZZLE"TAB(29)"
    {6 Y}"
320 FORK=0TO3:POKE7754+K,100:POKE38474+K,
    0:POKE7864+K,99:POKE38564+K,0:NEXTK
330 FORK=22TO88STEP22:POKE7753+K,103:POKE
    38473+K,0:POKE7758+K,101:POKE38478+K,
    0:NEXTK
335 IFP1=0THEN340
336 FORK=0TO66STEP22:FORJ=0TO3:POKE7776+J
    +K,PEEK(7605+J+K)
337 POKE38496+J+K,PEEK(7609+J+K):NEXTJ:NE
    XTK:GOTO352
340 READA,B,C:IFA=-1THEN355
350 POKE7776+A,B:POKE38496+A,C:GOTO340
352 READA,B,C:IFA=-1THEN355
353 GOTO352
355 FORT=1TO1500:NEXT
360 POKES1,235:POKEV,15:PRINT"{HOME}"TAB(
    228)"{RVS}{RED}!GO!{OFF}{BLU}"
365 FORT=1TO500:NEXT:PRINT"{HOME}"TAB(228
    )"{4 SPACES}":POKES1,0:TI$="000000"
370 IFH<>1THEN380
375 IFT$<=TI$THENT$=TI$:GOTO600
380 GETB$:IFB$=""THEN370
390 D=ASC(B$):ON-(D=47)-2*(D=58)-3*(D=61)
    -4*(D=64)-5*(D=13)GOTO410,440,470,500
    ,620
400 GOTO370
410 IFPEEK(S-22)=100THEN370
420 POKES,PEEK(S-22):POKESC,PEEK(SC-22):P
    OKES-22,32:POKESC-22,1:S=S-22:SC=SC-2
    2
430 GOSUB530:GOTO370
440 IFPEEK(S+1)=101THEN370
450 POKES,PEEK(S+1):POKESC,PEEK(SC+1):POK
    ES+1,32:POKESC+1,1:S=S+1:SC=SC+1
460 GOSUB530:GOTO370
470 IFPEEK(S-1)=103THEN370
480 POKES,PEEK(S-1):POKESC,PEEK(SC-1):POK
    ES-1,32:POKESC-1,1:S=S-1:SC=SC-1
490 GOSUB530:GOTO370
500 IFPEEK(S+22)=99THEN370
510 POKES,PEEK(S+22):POKESC,PEEK(SC+22):P
    OKES+22,32:POKESC+22,1:S=S+22:SC=SC+2
    2
520 GOSUB530:GOTO370
530 FORM=0TO66STEP22:FORN=0TO3STEP1
540 W=PEEK(7776+M+N):IFW-128>0THENW=W-128
550 IFW<>PEEK(8018+M+N)THENRETURN
560 NEXTN:NEXTM
570 T$=TI$:PRINT"{HOME}"TAB(226)"{RVS}
    {YEL}YOU WIN!{OFF}{BLU}"
580 READN,D:IFN=-1THEN620
585 POKES1,N:FORT=1TOD:NEXT:GOTO580
600 PRINT"{HOME}"TAB(225)"{RVS}{GRN}!YOU
    {SPACE}LOSE!{OFF}{BLU}":POKES2,135:PO
    KES1,128:FORT=1TO500:NEXT
610 POKES2,0:POKES1,0
620 T$=TI$:FORK=0TO66STEP22:FORJ=0TO3:POK
    E7605+K+J,PEEK(7776+K+J)
630 POKE7609+K+J,PEEK(38496+K+J):NEXTJ:NE
```


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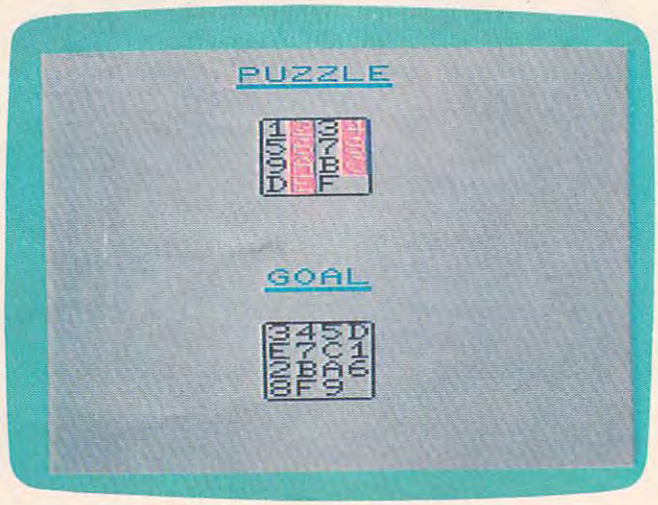
```
    XTK
700 PRINTTAB(199)"HIT RETURN TO PLAY"SPC(
    10)"AGAIN"
710 PRINT"{3 RIGHT}TIME="LEFT$(T$,2);":"M
    ID$(T$,3,2);":"RIGHT$(T$,2)
720 GETC$:IFC$=""THEN720
730 IFC$=CHR$(13)THENPOKESS,INT(S/256):PO
    KESS+1,SAND255:CLR:GOTO736
735 GOTO720
736 PRINT"{CLR}RESET.............{RVS}
    {GRN}1{OFF}{BLU}{HOME}{2 DOWN}OR AS Y
    OU LEFT IT.{RVS}{PUR}2{OFF}{BLU}"
737 GETV$:IFV$=""THEN737
738 IFV$<"1"ORV$>"2"THEN737
739 IFV$="1"THEN2
740 IFV$="2"THENP1=1:GOTO3
745 DATA0,49,0,1,178,4,2,51,0,3,180,4
750 DATA22,53,0,23,182,4,24,55,0,25,184,4
760 DATA44,57,0,45,129,4,46,2,0,47,131,4
770 DATA66,4,0,67,133,4,68,6,0,69,32,1
780 DATA-1,-1,-1
790 DATA208,150,0,50,208,75,0,50,208,75,2
    18,175,208,115,218,175,224,250,0,0,-1
    -1
```



"Mosaic Puzzle," VIC version.

Program 2: Mosaic Puzzle — 64 Version

Translation by Chris Metcalf, Programming Assistant

```
1  POKE55,176:POKE56,29:CLR
2  S=7845:SC=38565:SS=7603:GOTO4
3  SS=7603:S=PEEK(SS)*256+PEEK(SS+1):SC=S+
   30720
4  DIMA$(16)
5  PRINT"{CLR}":G=8018:X=0:DX=1:P=38738:V=
   36878:S1=36876:S2=36877:POKEV,15
10 PRINT"TIME LIMIT? {RVS}{GRN}Y{OFF}
   {RVS}{PUR}N{OFF}{BLU}"
20 GETA$:IFA$=""THEN20
30 IFA$<"N"ORA$>"Y"THEN20
40 IFA$=>"O"ANDA$<="X"THEN20
50 IFA$="N"THEN70
60 PRINT"{CLR}":INPUT"HRS:MINS:SEC";T$:H=
   1:IFLEN(T$)<>6THEN60
62 IFLEFT$(T$,2)>"23"ORLEFT$(T$,2)<"0"THE
   N60
64 IFMID$(T$,3,2)>"59"ORMID$(T$,3,2)<"0"T
   HEN60
66 IFRIGHT$(T$,2)>"59"ORRIGHT$(T$,2)<"0"T
   HEN60
70 PRINT"{CLR}"TAB(24)"TYPE IN GOAL ORDER
   "
80 PRINT"{DOWN}{3 SPACES}1 2 3 4 5 6 7 8
   {SPACE}9"SPC(8)"A B C D E F {RVS}S
   {OFF}"TAB(49)"IN ANY ORDER"
90 PRINTTAB(118)"GOAL"TAB(30)"[4 Y]"
100 FORK=0TO3:POKE7996+K,100:POKE8106+K,9
    9:POKE38716+K,0:POKE38826+K,0:NEXTK
110 FORK=22TO88STEP22:POKE7995+K,103:POKE
    8000+K,101:POKE38715+K,0:POKE38720+K,
    0:NEXTK
130 FORI=1TO16STEP1
140 GETA$(I):IFA$(I)=""THEN140
150 FORL=I-1TO0STEP-1:IFA$(I)=A$(L)THEN14
    0
160 NEXTL
165 IFA$(I)="S"THEN190
170 IFA$(I)<="0"ORA$(I)=>"G"THEN140
180 IFA$(I)=>":"ANDA$(I)<="@"THEN140
190 B=VAL(A$(I)):C=B+48:IFB=0THEN220
200 POKE38467+2*B,7:POKEG+X,C:POKEP+X,0:X
    =X+DX:IFX=4THENG=G+22:P=P+22:X=0
210 NEXTI:IFI=17THEN300
220 IFA$(I)="A"THENB=1
230 IFA$(I)="B"THENB=2
240 IFA$(I)="C"THENB=3
250 IFA$(I)="D"THENB=4
260 IFA$(I)="E"THENB=5
270 IFA$(I)="F"THENB=6
272 B2=B
275 IFA$(I)="S"THENB=7:B2=32
280 POKE38492+2*B,7:POKEG+X,B2:POKEP+X,0:
    X=X+DX:IFX=4THENG=G+22:P=P+22:X=0
290 NEXTI
300 FORR=0TO132:POKE7702+R,32:POKE38422+R
    ,1:NEXTR
310 PRINT"{HOME}"TAB(29)"PUZZLE"TAB(29)"
    [6 Y]"
320 FORK=0TO3:POKE7754+K,100:POKE38474+K,
    0:POKE7864+K,99:POKE38584+K,0:NEXTK
330 FORK=22TO88STEP22:POKE7753+K,103:POKE
    38473+K,0:POKE7758+K,101:POKE38478+K,
    0:NEXTK
335 IFP1=0THEN340
336 FORK=0TO66STEP22:FORJ=0TO3:POKE7776+J
    +K,PEEK(7605+J+K)
337 POKE38496+J+K,PEEK(7609+J+K):NEXTJ:NE
    XTK:GOTO352
340 READA,B,C:IFA=-1THEN355
350 POKE7776+A,B:POKE38496+A,C:GOTO340
352 READA,B,C:IFA=-1THEN355
353 GOTO352
355 FORT=1TO1500:NEXT
360 POKES1,235:POKEV,15:PRINT"{HOME}"TAB(
    228)"{RVS}{RED}!GO!{OFF}{BLU}"
365 FORT=1TO500:NEXT:PRINT"{HOME}"TAB(228
    )"{4 SPACES}":POKES1,0:TI$="000000"
370 IFH<>1THEN380
375 IFT$<=TI$THENT$=TI$:GOTO600
380 GETB$:IFB$=""THEN370
390 D=ASC(B$):ON-(D=47)-2*(D=58)-3*(D=61)
    -4*(D=64)-5*(D=13)GOTO410,440,470,500
    ,620
400 GOTO370
410 IFPEEK(S-22)=100THEN370
420 POKES,PEEK(S-22):POKESC,PEEK(SC-22):P
    OKES-22,32:POKESC-22,1:S=S-22:SC=SC-2
    2
430 GOSUB530:GOTO370
440 IFPEEK(S+1)=101THEN370
```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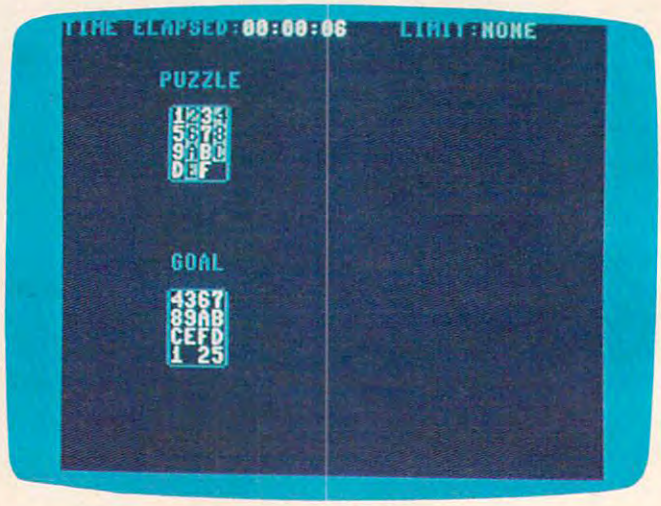
Commodore 64 Notes

Chris Metcalf, Programming Assistant

The Commodore 64 version of "Mosaic Puzzle" is very much the same as the original VIC version. However, some minor changes have been made. Either the RETURN key or the fire button allows you to pause momentarily before resuming the game, restarting the program, or stopping play entirely. Breaking off and resuming has no effect on the time clock (displayed at the top of the screen along with the time limit).

As an aid to the user, various keys for up, down, right, and left can be selected at the beginning of the game. A joystick can also be used, as long as it is plugged into control port two. The time limit is an option in this version; if no time limit is selected, the screen will display elapsed time and TIME LIMIT:NONE.

```
450 POKES,PEEK(S+1):POKESC,PEEK(SC+1):POK
    ES+1,32:POKESC+1,1:S=S+1:SC=SC+1
460 GOSUB530:GOTO370
470 IFPEEK(S-1)=103THEN370
480 POKES,PEEK(S-1):POKESC,PEEK(SC-1):POK
    ES-1,32:POKESC-1,1:S=S-1:SC=SC-1
490 GOSUB530:GOTO370
500 IFPEEK(S+22)=99THEN370
510 POKES,PEEK(S+22):POKESC,PEEK(SC+22):P
    OKES+22,32:POKESC+22,1:S=S+22:SC=SC+2
    2
520 GOSUB530:GOTO370
530 FORM=0TO66STEP22:FORN=0TO3STEP1
540 W=PEEK(7776+M+N):IFW-128>0THENW=W-128
550 IFW<>PEEK(8018+M+N)THENRETURN
560 NEXTN:NEXTM
570 T$=TI$:PRINT"{HOME}"TAB(226)"{RVS}
    {YEL}YOU WIN!{OFF}{BLU}"
580 READN,D:IFN=-1THEN620
585 POKES1,N:FORT=1TOD:NEXT:GOTO580
600 PRINT"{HOME}"TAB(225)"{RVS}{GRN}!YOU
    {SPACE}LOSE!{OFF}{BLU}":POKES2,135:PO
    KES1,128:FORT=1TO500:NEXT
610 POKES2,0:POKES1,0
620 T$=TI$:FORK=0TO66STEP22:FORJ=0TO3:POK
    E7605+K+J,PEEK(7776+K+J)
630 POKE7609+K+J,PEEK(38496+K+J):NEXTJ:NE
    XTK
700 PRINTTAB(199)"HIT RETURN TO PLAY"SPC(
    10)"AGAIN"
710 PRINT"{3 RIGHT}TIME="LEFT$(T$,2);":"M
    ID$(T$,3,2);":"RIGHT$(T$,2)
720 GETC$:IFC$=""THEN720
730 IFC$=CHR$(13)THENPOKESS,INT(S/256):PO
    KESS+1,SAND255:CLR:GOTO736
735 GOTO720
736 PRINT"{CLR}RESET.............{RVS}
    {GRN}1{OFF}{BLU}{HOME}{2 DOWN}OR AS Y
    OU LEFT IT.{RVS}{PUR}2{OFF}{BLU}"
737 GETV$:IFV$=""THEN737
738 IFV$<"1"ORV$>"2"THEN737
739 IFV$="1"THEN2
740 IFV$="2"THENP1=1:GOTO3
745 DATA0,49,0,1,178,4,2,51,0,3,180,4
750 DATA22,53,0,23,182,4,24,55,0,25,184,4
760 DATA44,57,0,45,129,4,46,2,0,47,131,4
770 DATA66,4,0,67,133,4,68,6,0,69,32,1
780 DATA-1,-1,-1
790 DATA208,150,0,50,208,75,0,50,208,75,2
    18,175,208,115,218,175,224,250,0,0,-1
    ,-1
```



"Mosaic Puzzle," 64 version.

Program 3: Mosaic Puzzle – Atari Version

Translation by Marc Sugiyama, Programming Assistant

```
110 DIM ANS$(1),PUZZLE$(16),GOAL$(16
    ),TEMP$(1)
120 PUZZLE$="123456789ABCDEF ":GOAL$
    ="{16 SPACES}"
130 CHBASE=PEEK(106)*256:IF PEEK(CHB
    ASE+17)=102 AND PEEK(CHBASE+470)
    =126 THEN 190
140 POKE 106,PEEK(106)-6:GRAPHICS 2+
    16:SETCOLOR 0,0,0:POSITION 2,6:P
    RINT #6;"PLEASE STAND BY"
150 CHBASE=PEEK(106)*256
160 FOR I=0 TO 479:POKE CHBASE+I,PEE
    K(57344+I):POKE 708,PEEK(53770):
    NEXT I
170 FOR I=480 TO 487:POKE CHBASE+I,1
    :POKE CHBASE+8+I,128:NEXT I
180 FOR I=496 TO 511:POKE CHBASE+I,0
    :NEXT I:POKE CHBASE+496,255:POKE
     CHBASE+511,255
190 GRAPHICS 2:SETCOLOR 2,0,10
200 SETCOLOR 4,0,0:SETCOLOR 2,0,0:SE
    TCOLOR 1,0,8
210 TIME=0:PRINT "{CLEAR}DO YOU WANT
     A TIME LIMIT N{2 LEFT}";:INPUT
    ANS$:IF ANS$<>"Y" AND ANS$<>"N"
    THEN 210
220 IF ANS$="N" THEN 290
230 TRAP 230:PRINT "{CLEAR}NUMBER OF
     MINUTES 9{2 LEFT}";:INPUT MIN
240 TRAP 40000:IF MIN<0 OR MIN<>INT(
    MIN) THEN 230
250 TIME=3600*MIN
260 TRAP 260:PRINT "{CLEAR}NUMBER OF
     SECONDS 0{2 LEFT}";:INPUT SEC
```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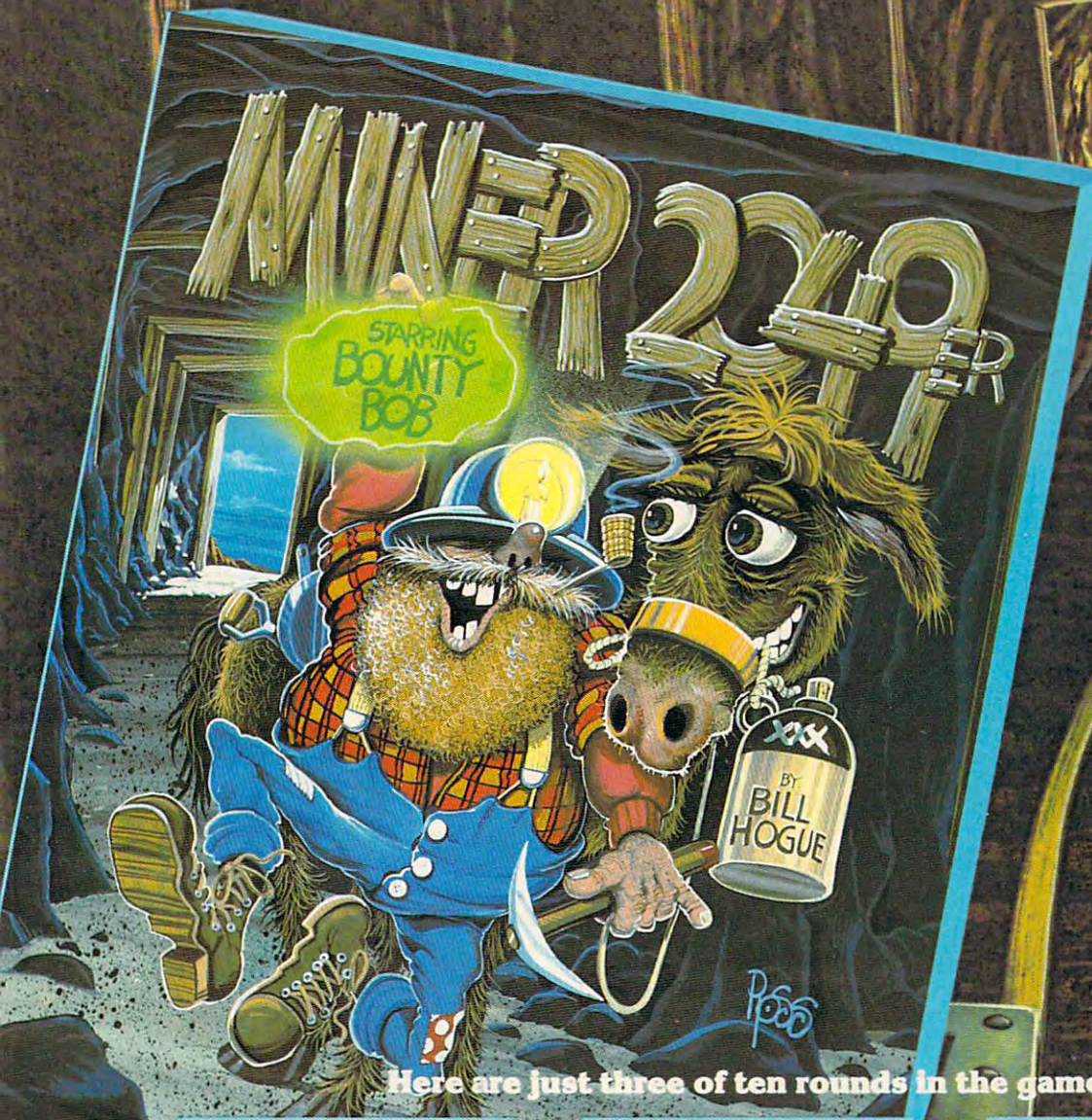

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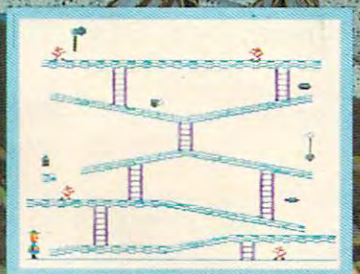
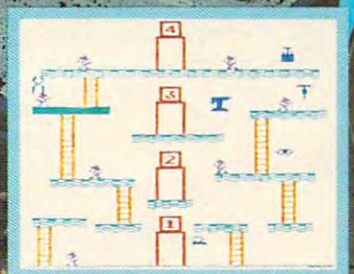
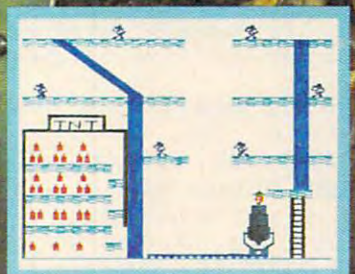
Here are just three of ten rounds in the game:



Round 1: The Mine Shaft.
Sharpen your miner's skill!



Round 3: The Transporters.
Beam yourself up!



Round 10: The Cannon.
Shoot yourself to the top!

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Atari Notes

Marc Sugiyama, Programming Assistant

"Mosaic Puzzle" for the Atari is similar to the original VIC version; however, there are some differences. As you select the order for the goal, the letters will move from the puzzle box to the goal box. The game begins once you have selected all of the letters and numbers (do not forget about the space). If you have selected a time limit, the amount of time you have left is displayed at the bottom of the screen. If you did not select a time limit, the elapsed time is displayed.

You move the space (hole) around the puzzle board with a joystick plugged into the first port. Pressing the trigger activates the pause function. The timer is stopped, but the screen is cleared as well. Pressing the trigger again returns you to the game. Pressing Q while you are in the game allows you to quit the program.

```
270 TRAP 40000:IF SEC<0 OR SEC<>INT(
    SEC) OR SEC>59 THEN 260
280 TIME=TIME+SEC*60:IF TIME=0 THEN
    230
290 GRAPHICS 2+16:SETCOLOR 4,0,0:SET
    COLOR 2,8,8:SETCOLOR 0,1,4:SETCO
    LOR 1,5,10:POKE 756,CHBASE/256
300 XPOS=4:YPOS=3
310 GOSUB 880:GOSUB 860
320 POSITION 1,11:PRINT #6;"TYPE IN
    GOAL ORDER":SPACE=1:OPEN #1,4,0,
    "K:"
330 GET #1,AC:IF (AC<49 OR AC>70 OR
    (AC>57 AND AC<65)) AND AC<>32 TH
    EN 330
340 IF AC=32 THEN HERE=16:GOTO 360
350 HERE=AC-48:IF HERE>9 THEN HERE=H
    ERE-7
360 IF PUZZLE$(HERE,HERE)=" " THEN 3
    30
370 PUZZLE$(HERE,HERE)=" ":GOAL$(SPA
    CE,SPACE)=CHR$(AC+128):SPACE=SPA
    CE+1
380 GOSUB 860:GOSUB 870:IF SPACE<>17
     THEN 330
390 CLOSE #1:PUZZLE$="123456789ABCDE
    F■":GOSUB 860:POSITION 1,11:PRIN
    T #6;"{18 SPACES}"
400 POKE 18,0:POKE 19,0:POKE 20,0
410 CLOCK=PEEK(18)*65536+PEEK(19)*25
    6+PEEK(20)
420 IF TIME<>0 AND CLOCK>=TIME THEN
    580
430 POSITION 5,11:IF  NOT TIME THEN
    450
440 MIN=INT((TIME-CLOCK)/3600):SEC=I
    NT((TIME-CLOCK)/60)-60*MIN:GOTO
    460
450 MIN=INT(CLOCK/3600):SEC=INT(CLOC
    K/60)-60*MIN
460 PRINT #6;"TIME ";MIN;":";SEC;" "
    :IF STRIG(0)=0 THEN 780
470 IF PEEK(764)=47 THEN 670
480 JOY=STICK(0):IF JOY=15 THEN 410
490 HERE=XPOS+YPOS*4
500 IF JOY=13 AND YPOS<>0 THEN THIS=
    -4:GOSUB 560:YPOS=YPOS-1
510 IF JOY=14 AND YPOS<>3 THEN THIS=
    4:GOSUB 560:YPOS=YPOS+1
520 IF JOY=7 AND XPOS<>1 THEN THIS=-
    1:GOSUB 560:XPOS=XPOS-1
530 IF JOY=11 AND XPOS<>4 THEN THIS=
    1:GOSUB 560:XPOS=XPOS+1
540 POKE 77,0:GOSUB 860:IF PUZZLE$=G
    OAL$ THEN 720
550 GOTO 410
560 SOUND 0,100,10,10:TEMP$=PUZZLE$(
    HERE+THIS,HERE+THIS):PUZZLE$(HER
    E,HERE)=TEMP$
570 PUZZLE$(HERE+THIS,HERE+THIS)="■"
    :SOUND 0,0,0,0:RETURN
580 GRAPHICS 2+16:SETCOLOR 0,0,0:POS
    ITION 0,5:PRINT #6;"YOU RAN OUT
    OF TIME!":FOR I=0 TO 254 STEP 2
590 POKE 708,255-I:SOUND 0,I,10,10:N
    EXT I:SOUND 0,0,0,0
600 GRAPHICS 2+16:SETCOLOR 0,0,10
610 POSITION 7,1:PRINT #6;"PRESS:":P
    OSITION 3,3:PRINT #6;"1)TO CONTI
    NUE"
620 POSITION 2,5:PRINT #6;"2)TO STAR
    T OVER"
630 OPEN #1,4,0,"K:"
640 GET #1,AC:IF AC<>49 AND AC<>50 T
    HEN 640
650 CLOSE #1:IF AC=49 THEN TIME=0:GO
    SUB 880:GOSUB 860:GOSUB 870:POKE
     18,0:POKE 19,0:POKE 20,0:GOTO 4
    10
660 RUN
670 T1=PEEK(18):T2=PEEK(19):T3=PEEK(
    20):GRAPHICS 2+16:SETCOLOR 0,0,1
    0
680 POSITION 0,6:PRINT #6;"DO YOU WA
    NT TO QUIT?":OPEN #1,4,0,"K:"
690 GET #1,AC:IF AC<>89 AND AC<>78 T
    HEN 690
700 CLOSE #1:IF AC=89 THEN GRAPHICS
    0:END
710 GOSUB 880:GOSUB 860:GOSUB 870:PO
    KE 20,T3:POKE 19,T2:POKE 18,T1:G
    OTO 410
720 FOR I=1 TO 100:POKE 712,PEEK(537
    70):NEXT I
730 GRAPHICS 2+16:SETCOLOR 0,0,0:POS
    ITION 4,5:PRINT #6;"YOU DID IT!!
    ":FOR I=0 TO 254 STEP 2:POKE 708
    ,I
740 SOUND 0,255-I,10,10:NEXT I
750 GRAPHICS 2+16:POSITION 3,5:SETCO
    LOR 0,1,10:PRINT #6;"PRESS  TRIG
    GER":POSITION 4,6:PRINT #6;"TO T
    RY AGAIN"
760 IF STRIG(0)=1 THEN 760
770 RUN
780 GRAPHICS 2+16:T1=PEEK(18):T2=PEE
    K(19):T3=PEEK(20):POSITION 4,10:
    PRINT #6;"PAUSE ACTIVE"
790 POSITION 3,11:PRINT #6;"PRESS  T
    RIGGER"
800 IF STRIG(0)=0 THEN 800
810 IF STRIG(0)=1 THEN 810
```


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